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Role of agricultural education in the development of agriculture in Ethiopia

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**ROLE OF AGRICULTURAL EDUCATION
IN THE DEVELOPMENT OF AGRICULTURE IN ETHIOPIA**

by

Dean Alexander Elliott

**A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of
The Requirements for the Degree of
DOCTOR OF PHILOSOPHY**

Major Subject: Vocational Education

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INTRODUCTION

A number of American colleges and universities have assumed contractual responsibilities with the United States Government in providing technical assistance to underdeveloped areas since World War II. In most instances, the college or university has been called upon to organize, in a particular country, a program of agricultural education designed to augment existing educational facilities sponsored by other agencies. The present study is a descriptive survey of the overall agricultural education program in Ethiopia, including activities carried on by the host Government, the United Nations, and the United States Government through a contract arrangement with the Oklahoma Agricultural and Mechanical Arts College.

There are three general parts to the study. The first is a description of certain factors which, in Ethiopia, are fundamentally associated with agricultural education. These include the country and people, the native agriculture, and the existing general education facilities. The second part consists of a description of the agricultural education which has been carried on to date in Ethiopia. The third part consists of recommendations for the expansion and improvement of agricultural education in Ethiopia.

An effort has been made to present the information in

such a way that it may be of value in the United States as well as in Ethiopia. In the latter country, the study should be useful in outlining an expanded program of agricultural education. The recommendations which have been presented should be directly applicable. Beyond this, it is hoped that the study may be of some use as a reference for students in Ethiopia where there is relatively little in the way of indigenous writing. An attempt has been made to make the material readable as well as informative.

In the United States, the survey should be useful in bringing about a clearer understanding of problems which have been encountered in establishing a program of agricultural education in one underdeveloped country. Also, it should be useful in planning future technical assistance for Ethiopia and, to a limited extent, for certain other countries.

Many sources were utilized in securing material for this study. Officials of the Imperial Ethiopian Government were very cooperative in discussing matters pertinent to the study. The same was true of officials of the United States technical assistance mission in Ethiopia. Unclassified reports from both agencies were utilized. All of the aforementioned were primary sources. Ethiopian libraries in various parts of the country and the British Museum in London were visited. Both primary and secondary sources were reviewed at these centers. In addition, secondary sources of

information were obtained from various libraries in the United States including the Library of Congress.

At the time the collection of data was begun in 1953, there arose a particularly perplexing problem regarding the spelling of geographical names in Ethiopia. This was due, in part, to the fact that there is no satisfactory system of transliteration between Amharic, the national language of Ethiopia, and English. However, by the time writing was begun in September, 1956, the problem had been largely resolved as a result of research which has been carried on by the Imperial Ethiopian Geography and Mapping Institute in Addis Abeba. Under the direction of Dr. Gordon B. Shilz, the Institution has undertaken, among other activities, a standardization of the spelling of geographical names in Ethiopia. The spelling of names as proposed by the Institution has been used where possible throughout the study. Obviously, certain discrepancies have arisen in connection with quotations and names of publications, institutions, etc. In these instances spelling has been made to comply with the original, although the preferred spelling may have been included.

Throughout the study, a special effort has been made to avoid comparing practices, methods, and facilities in Ethiopia with those in the United States or another highly industrialized nation. This was done because it is considered

neither necessary nor even desirable that development in Ethiopia follow, exactly, the pattern set in highly industrialized nations.

COUNTRY AND PEOPLE

There are a number of factors associated with the country and the people that have a bearing upon the development of agricultural education in Ethiopia. These include the history of the country, the geography, the transportation facilities, the people, the Ethiopian Orthodox Church, and the present Government. The rough terrain, the lack of transportation facilities, and the diversity among groups of people have had a retarding effect upon agricultural education. The Government, as is explained later in this manuscript, has done a great deal in recent years to promote education in agriculture.

History

A brief survey of the history of Ethiopia, formerly called Abyssinia, may be divided into five parts including the historical origin, the Axumite kingdom,¹ the period of isolation, the growth of the present state, and the Italian

¹Technically the country was not named "Ethiopia" until 1941. It was first known as the "Axumite kingdom." Later it was known as "Abyssinia." At the close of the Italian conquest the present Emperor decreed that the country should be called "Ethiopia."

conquest.¹ Only the most important events in each period will be mentioned.

The Historical Origin

The history of the country is closely linked with a highland region known as the Central Plateau and the peoples who have occupied this mountain fortress. Here were begun the rudiments of government which were gradually expanded to encompass the remainder of the country. With few exceptions, kingship has descended among highlanders. A productive agriculture, plenty of water, and the availability of the basic necessities of life within the Central Plateau have enabled its inhabitants to survive wars even though isolated from the outside world.

It is probable that the primitive inhabitants of the highlands were of Hamitic stock.² There is a twofold basis for this statement. First, early Egyptian stock was predominantly Hamitic in origin.³ Second, the Galla, Danakil, and

¹Confusion arises regarding terminology. The "Ethiopia" referred to in the Acts of Apostles, Chapter 8, can scarcely have been that which is known today. Historians point out that it must have been an earlier kingdom which existed on what is now the Nubian Desert in northern Sudan.

²Alega Taje of the Swedish Mission, Asmera, in his processed pamphlet, *Abyssinian History*, written in 1922, traced the historical connection between early Ethiopian tribes and Biblical figures.

³A. H. M. Jones and Elizabeth Monroe. *A history of Ethiopia*. Amen House. London, England. 1935. p. 7.

Somali tribes which now inhabit areas surrounding the Central Plateau are racially and linguistically akin to Hamites.

Early in the first millennium B. C. the Hamites were forced from the northern extremities of the highlands by invading Semitic colonizers who came from Yemen in southwest Arabia.¹ The immigrating Arab tribes probably did not all come to this land at one time but came in successive waves spanning a period of several hundred years. Thus, there appears to have been a gradual mixing of invading Semitic and indigenous Hamitic peoples. One of the immigrant Arab tribes, Ge'ez, has given its name to the fundamentally-Semitic classical language of the country.² Geez is also the liturgical language of the Church although as such it is declining in use. From Habashat, the name of another Arab tribe, may have been derived the term "Abyssinia," the name often applied to the country but not preferred by its people.²

The Axumite Kingdom

Successive invasions by Arabs and subsequent mixing with the indigenous tribes formed the core of the Kingdom of Axum which was centered in the city of the same name in

¹Ibid., pp. 7-8.

²Margery Perham. The government of Ethiopia. Faber and Faber, Ltd. 24 Russell Square, London, England. 1947. pp. 12-14.

what is now Tigre Province. The kingdom came into prominence about 75 A. D. and remained a strong influence on the Central Plateau for over six centuries.

One of the most important events of this period was the Christianizing of the Axumites which occurred during the fourth century A. D. Coptic Christianity was made the national religion as a result of the conversion of the king by an Egyptian student of philosophy named Frumentius.¹ A daughter church of the Church of Alexandria was established in the Axumite Kingdom.

The Axumites achieved great success as sea traders, as warriors, and as stone cutters. Their ships sailed almost unchallenged on the Red Sea. Their armies subdued tribes on all sides and periodically expanded the territory under the king's rule. Obelisks shaped from solid granite are still to be seen at Axum. The largest is about six stories in height. These giant monoliths serve as a timeless reminder that Ethiopia is a nation whose institutions, customs, and way of life are strongly rooted in the ancient past.

The Period of Isolation

The Islamic Arabs began the westward march of Mohammed's jiḥad (Arabic), or holy war, early in the seventh century A.D.

¹Jones and Monroe, op. cit., pp. 26-31.

Within the century Palestine, Syria, and Egypt were overrun. All Axumite ports on the Red Sea were occupied.¹ Deprived of access to the sea and having lost contact with Egypt and the mother church, the Axumites were forced into isolation.

During the period of isolation, Axumite rulers directed their efforts southward. Armies were sent into territory now known as southeastern Begemdir, southwestern Welo, and northern Shewa Provinces for the purpose of gaining new land and for the purpose of subduing opposing chieftains. Continuous warring, counter invasions by strong Hamitic tribes, and the dilution effect which resulted from the assimilation of outlying tribes materially weakened the kingdom. There followed a decline in power and a subsequent period of isolation.

The period of isolation brought an interruption in the "Solomonian dynasty"² which had ruled continuously since early in the first millennium B. C. About 1137 A. D. the throne was seized by a member of the Zague dynasty which is

¹Philip K. Hitti. History of the Arabs. 5th ed. rev. Macmillan. New York, N. Y. 1951. p. 164.

²The "Solomonian dynasty" or "Solomon line" claims descendency from King Solomon through an ancient ruler, Menelik I, son of the Queen of Sheba. That history does not bear this out does not alter the fact that such claim has been exploited by a great majority of the rulers including the present Emperor.

believed to have been of Negroid extraction.^{1,2} Historians do not agree on the length of time that the Zague dynasty ruled; however, they do agree that this was the only lengthy period in history when the rule of the "Solomonian line" was interrupted. During the Zague rule, the center of government was moved southward to Lalibella in the central part of Welo Province.

By 1270 A. D. the "Solomonian line" had regained control of the throne. As had been true in the past, most of the rulers from this line were staunch fighters. Perhaps because of this, the highlands were successfully defended during the next four centuries against repeated attacks by Moslem tribes from the east and by Galla tribes from the south. One able ruler by the name of Basilides, during his long reign from 1632 to 1665, built a new capital at Gwondar near Lake Tana in what is today Begemdir Province.³

During the fifteenth and sixteenth centuries, numerous official visitors were received from Europe. Several were missions representing the Church of Rome. Others were expeditions seeking a new trade route to India. Still others were explorers. Most were from Portugal, which was one of

¹Jones and Monroe, op. cit., pp. 48-49.

²The Negroid tribes belong to the Nilotic language group. It is one of three major language groups in the country.

³Jones and Monroe, op. cit., p. 108.

the major world powers at that time.

The growth of the present state

During the early part of the eighteenth century, there was begun a series of international political maneuvers by several European powers, including France, Great Britain, and Italy. Some of these manipulations were carried out with dire consequences for the small African country. They have been clearly elucidated in the well-documented work Ethiopia, a Pawn of European Diplomacy.¹

By 1885 Italy, one of the powers which was interested in the pawn, had acquired control of several ports along the Red Sea. These holdings were expanded through force, and were consolidated into one colony which was christened Eritrea (also Eritra)² in 1890. Relations between the Italians and Ethiopians deteriorated rapidly, and major fighting broke out in 1895. In the following year the Ethiopian warriors under their brilliant leader, Menelik II, routed the well-equipped Italian detachments at the battle of Adawa in Tigre Province.³

¹Ernest Work. *Ethiopia, a pawn of European diplomacy*. Macmillan. New York, N. Y. 1935.

²Throughout the present study the spelling of names will conform wherever possible to a preferred system now under development at the Imperial Ethiopian Mapping and Geography Institute. For a list of some of the names for which preferred spelling and pronunciation have been worked out see Appendix A.

³Jones and Monroe, op. cit., pp. 127-145.

Emperor Menelik while a young man had succeeded in subduing most of the powerful tribal kings. He was a member of the sizable Amhara tribe which has remained in power to the present. Menelik's rule was essentially undisputed following the defeat of the Italian forces. Thereafter, Ethiopia was recognized as a sovereign power in nearly all parts of the world.

Menelik was an enlightened monarch. He recognized the backwardness of his country and set about to improve it. A few of the improvements which he introduced were the postal system, the electric light, the telephone and the first government schools. Construction was begun on a railroad which was to link the port of Jibuti with the new capital at Addis Abeba. In 1898 the monarch issued an edict that everyone of his subjects was to be vaccinated against small-pox.¹ He imported grain to feed the people during a period of near-famine at the turn of the century.¹ Menelik died in 1913. For more than a decade following his death, little in the way of progress took place.

The period of relative inactivity ended on November 2, 1930, when Ras Tafari Makonnen was crowned Emperor under the throne-name of Haile Selassie I. The character of this

¹Sir E. A. Wallis Budge. A history of Ethiopia. 2 Vols. Metheun and Co., Ltd. 36 Essex Street, London, England. 1928. p. 539.

leader who is the ruling monarch at the time of writing is probably best described in the following words:

His record shows Haile Selassie to be a statesman of a high order, and a most astute negotiator. He is very tenacious of his own point of view and will never give way on what he feels is a matter of principle; but at the same time he will not let non-essentials stand in the way of agreement.¹

Patience, perseverance, and steadfastness are the key notes of his character--and they have stood him in good stead.²

An ardent supporter of Westernization, the young ruler immediately embarked upon a carefully-planned program of modernization. He recognized the urgent need for the abolition of the country's age-old slave trade. Corrective regulations were set into effect. He gave attention also to such matters as internal security, the establishment of a banking system, and a revamping of the judicial system. In connection with all of these improvements the services of foreign advisers were solicited.

The Emperor has long recognized the need for reform in land tenure, church, and government. Improvement within these institutions was begun shortly after the Emperor's coronation and has been continued to the present. Due to a relatively high degree of conservatism within the several

¹Christine Sandford. The Lion of Judah hath prevailed. J. M. Dent and Son, Ltd. London, England. 1955. p. 176.

²Ibid., p. 179.

institutions, progress has been slow. However, it has been continuous.

Perhaps no one aspect of Ethiopian life has received more constant attention from the Emperor than the improvement and expansion of educational facilities. Accomplishments in this field will be given major consideration in a subsequent section.

The Italian conquest

The broad program of reformation had only begun when war clouds began to form on the horizon. From 1928 through 1934, relations between Ethiopians and Italians were under strain. Minor incidents occurred between patrols on the borders of Eritra and Italian Somaliland. Late in 1934 a particularly disruptive incident took place in the Walwal district on the Somaliland border. The dispute purportedly arose over the use of water wells.

Ill feeling, which had been simmering for some time, exploded on December 5, 1934. Arbitration was attempted by the League of Nations, but without success. Finally, on October 3, 1935, Italian forces crossed the Mareb River in southwestern Eritra and invaded Ethiopian territory. A simultaneous attack was made by troops stationed in Italian Somaliland.

Sweeping advances were made. Ethiopian troops were

forced to retreat inland to mountainous terrain. On May 2, 1936, the Emperor renounced direction of affairs and left for the British Isles by way of Jibuti. Marshal Badoglio's forces entered Addis Abeba 3 days later. On that occasion, Signor Mussolini declared the war finished.¹

The Italian Occupation of Ethiopia lasted somewhat over 5 years and 8 months. The removal of the Occupation Government took place early in World War II. A British military mission was formed at Khartoum, and on August 12, 1940, it moved quietly through Italian lines and into the mountainous interior. Its purpose was to organize internal resistance. Shortly thereafter, the Emperor led troops which moved in from the northwest. Garrisons led by British and Belgian officers moved in from the south and from the east. Addis Abeba was recaptured on April 6, 1941. However, fighting in the north continued for some months.² The restoration of the Emperor to the throne took place in May, 1941.

The Ethiopian people suffered harsh treatment at the hands of the Italian occupation forces. Despite this fact,

¹Royal Institute of International Affairs. Survey of international affairs. 1935. Vol. II. Edited by Arnold J. Toynbee. Oxford University Press. London, England. 1936. pp. 527-534.

²Christine Sandford. Ethiopia under Haile Selassie. J. M. Dent and Son, Ltd. London, England. 1946. pp. 106-115.

the country may be considered to have benefited in several respects. First, the suddenness and completeness of the Italian victory during the period from 1935 to 1936 should have proved conclusively to the conservative group in Ethiopia that sweeping reformation was needed if the nation was to survive.

Second, the dissolution of the Italian colony of Eritra and its subsequent federation with Ethiopia in 1952 has materially benefited the country. Although of little value from the agricultural standpoint, Eritra did provide the former land-locked nation with two excellent harbors on the Red Sea.

There is a third way in which Ethiopia was benefited. Italians were builders. In Ethiopia they built serviceable roads and left hundreds of trucks which could be used to haul freight. They built government buildings, hotels, machine shops, livestock wells, irrigation systems, and schools. All fitted well into the program of modernization which the Emperor reinstituted following the Restoration.

Geography

The Empire of Ethiopia is situated in east Africa between 3 and 18 degrees north latitude. It borders the Red Sea, Sudan, Kenya, Somalia, British Somaliland, and French

Somaliland. The Empire consists of 12 provinces and the former Italian colony of Eritra. The name and location of the Provincial divisions are shown in Figure 1.

The area of land per capita in Ethiopia is shown in Table 1 on page 18. For comparison, that in other predominantly agricultural countries has been included. It should be noted that the figures include inland water.

Geographic features vary widely among parts of the country. Because geography holds a direct relationship to agriculture, to communication, and to other aspects of Ethiopian life, it will be considered in some detail. For purposes of this discussion, the country will be divided into five areas including the Central Plateau, Rift Valley, Dankali Plains, Eritra, and the Somali Plateau. Each area will be considered individually with respect to altitude, temperature, rainfall, principal rivers, and type of agriculture. Soils will be considered individually in a later section.

Central Plateau

Included in the area known as the Central Plateau are most of the provinces of Begemdir, Gwojam, Welega, Ilubabor, Kefa, Gemu Gwofa, Arusi, Shewa, the western half of Tigre, the western half of Welo, and a part of southcentral Eritra. Historically, this entire area was known as the "highlands."

Table 1. Area of land per capita in certain predominantly agricultural countries^a

Name of country	Population ^b	Area sq.km. ^c	Population per sq.km.	Hectares per capita	Area sq.mi. ^c	Population per sq.mi.	Acres per capita
Australia	9,138,000	7,704,165	1.2	84.4	2,974,581	3.1	208.5
Belgian Congo ^d	12,300,000	2,343,927	5.2	19.1	904,991	13.6	47.1
Denmark	4,422,000	42,932	102.9	1.0	16,576	266.8	2.4
Egypt	22,221,000	999,740	22.2	4.5	386,000	57.6	11.1
Ethiopia ^e	18,000,000	1,232,322	14.6	6.8	475,800	37.8	16.9
Greece	7,970,000	132,561	59.8	1.7	51,182	155.1	4.1
Iraq	4,970,000	435,415	11.4	8.8	168,114	29.6	21.6
Kenya	6,000,000	582,646	10.3	9.7	224,960	26.7	24.0
Philippines	21,650,000	299,404	72.2	1.4	115,600	187.3	3.4
Venezuela	5,750,000	912,050	6.3	15.9	352,143	16.3	39.3

^aAdapted from Richard L. Forstall. Chicago, Illinois. Area and population data for selected countries compiled by Rand McNally and Company (Private communication). January, 1957.

^bEstimate as of January 1, 1955.

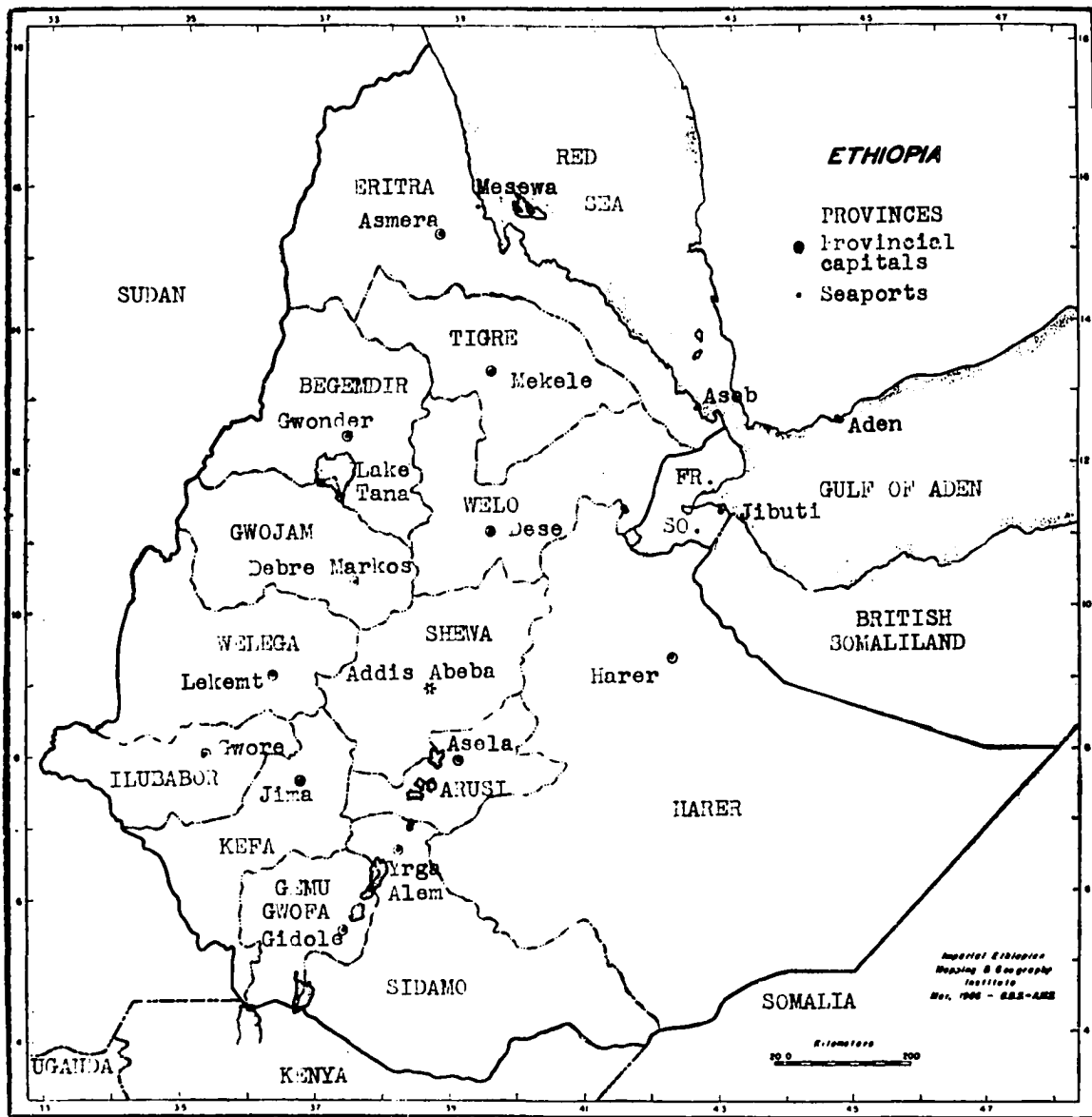
^cIncludes inland water area.

^dExcludes Ruanda-Urunda.

^eIncludes Eritra.

Figure 1. Provinces of Ethiopia¹

¹Adapted from Imperial Ethiopian Mapping and Geography Institute. Provinces and awrajas of Ethiopia. First edition. Map made and published by Institute. Addis Abeba, Ethiopia. April, 1956.



It is that part of the country which is most inhabitable and, because of its mountainous surface, most defensible. The Central Plateau consists of a series of extensive terraces rising from the plains of Sudan to elevations of over 3000 meters (9840 feet)¹ in central Ethiopia. Here the high terraces fuse with a longitudinal chain of mountains which enters from the north near the Red Sea and extends southward toward the Kenya-Ethiopian border. Geologically, the Central Plateau consists primarily of lava flows with a wide distribution of ash deposits.²

Massive, irregular, and tilting gently northwestward, the Central Plateau appears as a giant plow field in which certain of the tillage furrows have eroded, leaving a pattern of deep gorges and a corresponding network of streams and rivers feeding into the Nile River system. The largest river in Ethiopia, the Abay, or Blue Nile, originates in the highlands as overflow from Lake Tana. The latter is some 3600 square kilometers (1390 square miles) in area and is located at approximately the 1830-meter (6002-foot) level in north-

¹To increase the usefulness in Ethiopia of the material presented, weights and measures in the Metric System will be used. Where feasible those in the British System will also be presented. For the convenience of the reader certain rounding of figures will be followed consistently.

²Imperial Ethiopian College of Agriculture and Mechanical Arts. First annual report. Addis Abeba, Ethiopia. (Mimeo.) January, 1954. p. 6.

central Ethiopia. The watershed of the Blue Nile and its many tributaries is estimated to contain 181,000 square kilometers (69,685 square miles), or more than one-seventh of the area of the entire country. The Blue Nile has cut more than 900 meters (2952 feet) into the earth's surface to form a long, narrow, winding valley along the river's course where tropical fruits grow underneath, as it were, the barley-covered plateau above. The Blue Nile with its many tributaries has been a great factor in the isolation of groups within the borders of Ethiopia.

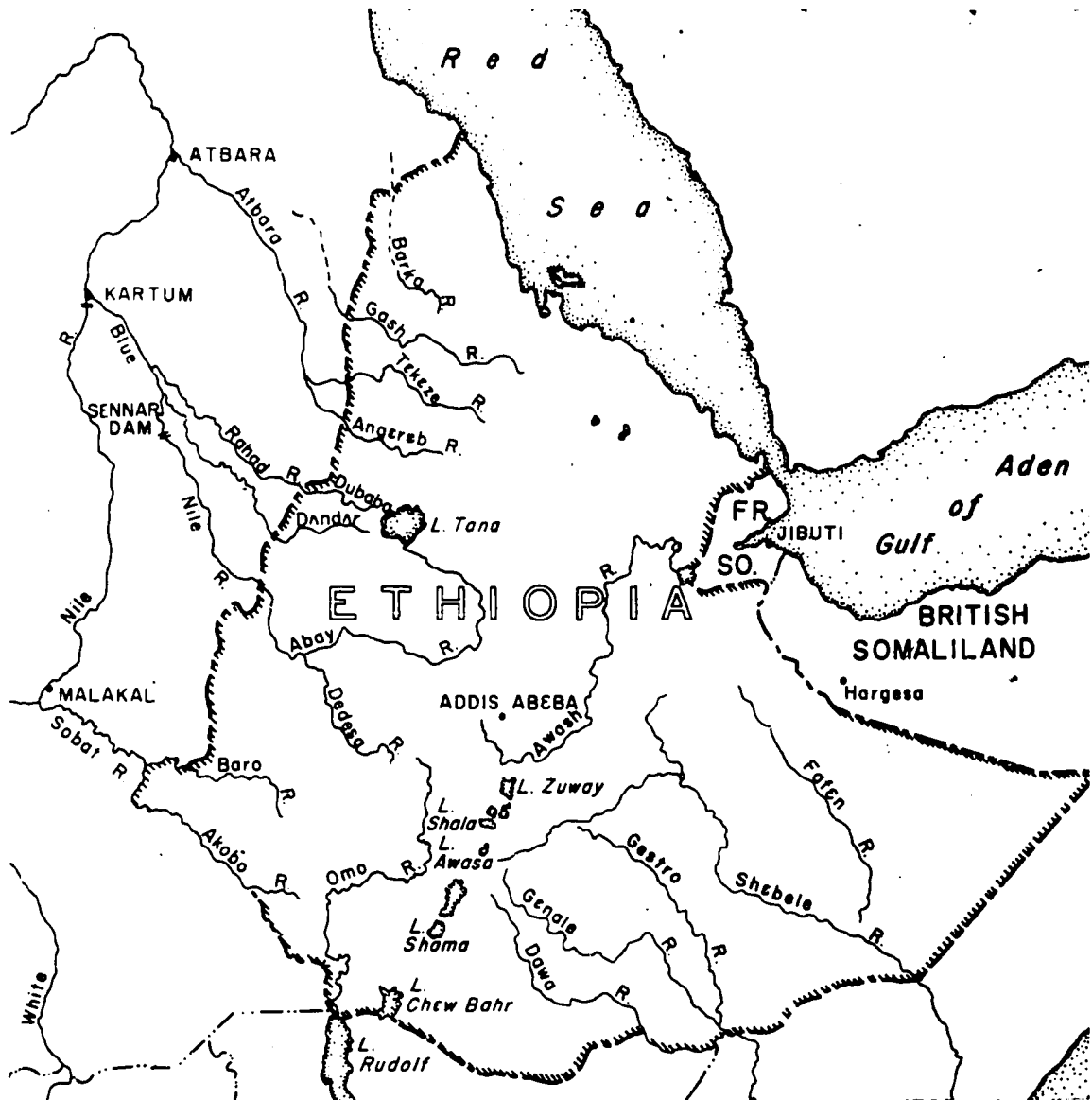
The principal rivers in Ethiopia are shown in Figure 2. It is to be noted that all of the rivers shown in Figure 2 with the exception of the Awash and the Fafen flow across Ethiopia's borders and onto adjoining territory. No major river flows from elsewhere into Ethiopia. Rivers which flow northwestward from the Central Plateau form a large part of the flow in the Blue and the White Nile rivers which feed the Nile. The Sobat and the Baro are navigable upstream as far as Dembi Dola in Welega Province. Only one river, the Omo, flows southward from the Central Plateau. It empties into Lake Rudolf inside the Kenya border.

The southeast corner of the Central Plateau is separated from the remainder of the highlands by the Rift Valley. This valley is an extensive breach in the earth's surface extend-

Figure 2. Rivers of Ethiopia^{1,2}

¹Adapted from Imperial Ethiopian Mapping and Geography Institute. Volume of rainfall and drainage basins. Preliminary edition. Map made and published by Institute. Addis Abeba, Ethiopia. March, 1956.

²The symbol " " shown on the map is used to represent the vowel sound in "sin."



ing from Lake Rudolf to the Red Sea. The detached section of the Plateau is made up of the Arusi Highlands in eastern Arusi Province and the Harer Plateau, a limited section of elevated terrain east of Dire Dewa in northwestern Harer Province. Joining the Arusi Highlands and the Harer Plateau are the Chercher Highlands.

Because of its altitude, most of which is above 1525 meters (5002 feet), the Central Plateau has moderate temperatures and considerable rainfall. There is occasional frost damage to crops above elevations of about 1500 meters (4920 feet). The mean annual temperature on the Central Plateau ranges from about 60 to 75 degrees Fahrenheit depending upon the elevation. With the exception of those places with extremely high altitude, climatic conditions are excellent for inhabitation.¹

In most sections of the Plateau, the months of April, May, and June are relatively warm and dry. Although the pattern varies, the period from early July through September is frequently a rainy season. The average annual rainfall for this and other areas can be seen from the map in Appendix B. The principal crops grown on the Central Plateau include tef (a native bread cereal), wheat, barley, sorghum, and chick peas. The raising of cattle is a major enterprise.

¹Ibid., p. 7.

In the southern section at altitudes of from 1500 to 2000 meters (4920 to 6560 feet), coffee is the chief crop produced. In the hot and humid Nile basin, tropical vegetation flourishes. Lemons, papaya, and bananas grow abundantly.

With few exceptions, areas adjacent to the highlands are low, hot, and dry. This is true of the Nubian Desert to the north, Ethiopia's Dankali Plains paralleling the Red Sea, and the Somali Plateau to the southeast. In southern Ethiopia there is considerable vegetative growth although the climate is hot and evaporation rate is high. Neighboring Sudan to the west is hot and dry except for river valleys where both temperature and humidity are very high.

Rift Valley

The "great rift" or Rift Valley is a depression which stretches from the central part of Africa northeastward to the Red Sea. The southern portion of the Rift contains a succession of lakes. In the province of Arusi, this valley divides the Central Plateau. Approaching the Red Sea, the Rift Valley widens to include most of northern Harer Province and portions of adjoining provinces. At the southern border near Lake Rudolf, the valley walls are well defined, and fault lines reveal the immensity of the earth's movements that must have taken place. On the floor of the Rift, volcanic craters abound varying in size and age. From its

mountain source near Addis Abeba, the Awash River flows northeastward through the Valley to its desert terminus at Lake Gamarri on the border of French Somaliland.

Altitude readings on the floor of the Valley range from about 1370 to 1680 meters (4494 to 5510 feet). Because of its lower average elevation, the Rift Valley is much warmer than the Central Plateau. However, the temperature is not unduly warm even during the dry season. Rainfall varies from 600 millimeters (23.6 inches) in the vicinity of the lakes to less than two-fifths that amount in the north. Evaporation is high.

Natural vegetation is of the steppe type consisting of tall bunch grass, cactus, and scrub trees. In the driest sections farming is limited to the vicinities of streams, lakes, and the flood plain of the Awash. Where rainfall is sufficient or where irrigation water is available, sorghum, maize, and wheat are grown.¹

Dankali Plains

Extending from the Rift Valley northward over the eastern half of Welo and the eastern half of Tigre provinces is a desert area called the Dankali plains. This area is bracketed between the Central Plateau and the Red Sea. Dry, windswept, and with less than 250 millimeters (9.8 inches)

¹Ibid.

of rainfall, the Dankali Plains are inhabited by nomadic tribes which continually migrate to obtain feed for camels, sheep, and goats. The temperature may rise well above 100 degrees Fahrenheit during the day time, but it usually drops to 60 degrees or less at night. Vegetation is of the desert type and includes short bunch grass, cactus, and thorn bushes. Farming is practiced only in isolated localities where irrigation water is available and where conditions are such as to allow the inhabitants to remain in one place for sufficient time to grow crops.

Eritra

With the exception of a triangular-shaped section in the southcentral part, Eritra does not have the typical highland climate. Approximately sixty-five percent of the total area of Eritra lies between 600 and 760 meters (1968 to 2493 feet) in altitude. At this elevation, except in isolated places, evaporation exceeds precipitation and good crops are produced only on flood plains and along permanent rivers or where irrigation water is available.¹ Near Teseney on the Sudan border, excellent production is obtained with irrigation.

Flowing westward from within Eritra to the north are the

¹Harvey M. Coverly. Asmera, Eritra. Agriculture in Eritra. (Personal interview). June, 1954.

Barka and Gash rivers. Although each flows all year, neither is large. To the south of these are the Tekeze and Angereb rivers which are sizable and join to form the Atbara outside of Ethiopia. There is considerable possibility for irrigation along each of these four rivers.

Due to the limited rainfall, most of the farming in Eritra is done on the plateau or on rolling land adjacent to the plateau. The principal crops grown are sorghum, barley, tef, and cotton. Considerable medium- to long-staple cotton is grown under irrigation in the area surrounding Teseney. Cattle, sheep, and goats are numerous. Overgrazing is ever present.¹

Somali Plateau

This area includes the greater portion of Harer Province and the eastern half of Sidamo Province. Southwest Harer is predominantly marine-deposited sediment while Sidamo is surfaced principally by worn down mountains. The entire Somali Plateau is dry and sandy. A number of rivers form on the southeastern slopes of the Central Plateau and flow onto the Somali Plateau. Chief among them are the Dawa, the Genale, and the Gesto, the three of which join courses at the Ethiopian border. From the Harer Plateau

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 8.

flows the Shebele. This river, though sizable, does not reach the sea but sinks into the hot sands of the coastal plains of Somaliland. Likewise, nearby Fafen River flows to a desert terminus.

Over most of this area, rainfall is inadequate to permit the raising of crops. However, bunch grass and scrub trees abound, particularly in areas of the greatest elevation, and large herds of cattle are raised. Some of the best cattle in Ethiopia are produced in Sidamo Province.

People

The inhabitants of Ethiopia may be classified on various bases. These include religion, language, and sonaron zones, or means of livelihood.¹ For purposes of the present study it will be appropriate to consider one classification based upon religion and another based upon language.

Religion

The Central Plateau, which may be described as a huge butte surrounded by lowlands, roughly demarcates the areas occupied by three major religious groups; namely, Coptic Christians, Moslems, and Animists. The first group is con-

¹John Dietrich. Cedar Rapids, Iowa. Information concerning people and tribes of Ethiopia. (Private communication). April, 1957.

centrated on the Plateau. Moslems predominate in the eastern one-third of the country and in Eritra. Animists predominate in the southwest and west. The area occupied by each of the groups can be seen from Figure 3. It is to be noted that there is considerable overlapping among the major groups. It should also be noted that a small "island" of Jews is contained in Begemdir Province.

North¹ has listed 17 major tribes among the highlanders, most or all of which are at least nominally Christian. The listing of tribes shown in Table 2 is made at the risk of oversimplifying the varied and complex array of cultural units in Ethiopia. Initial acquaintance with the situation reveals at once the almost infinite variation which exists among tribes and customs. No attempt will be made to enumerate the tribes which inhabit the lowlands adjoining the Plateau.

Specific mention should be made of the Amhara tribe and the Galla tribes. The former is the ruling group in Ethiopia and the group whose language has been made the national tongue. Myhre² has estimated that Amharic is spoken by approximately 3.5 million people. This figure does not

¹William H. North. Ethiopian Church and the development of the country. Addis Abeba, Ethiopia. (Unpublished research). August, 1954. p. 2.

²P. M. Myhre. Ethiopia's language problem. Report submitted to Ethiopian-United States Cooperative Education Program. Addis Abeba, Ethiopia. (ca. 1954).

Figure 3. People and religions of Ethiopia¹

¹Adapted from William H. North. Ethiopian Church and the development of the country. Addis Abeba, Ethiopia. (Unpublished research). August, 1954. pp. 2-4.

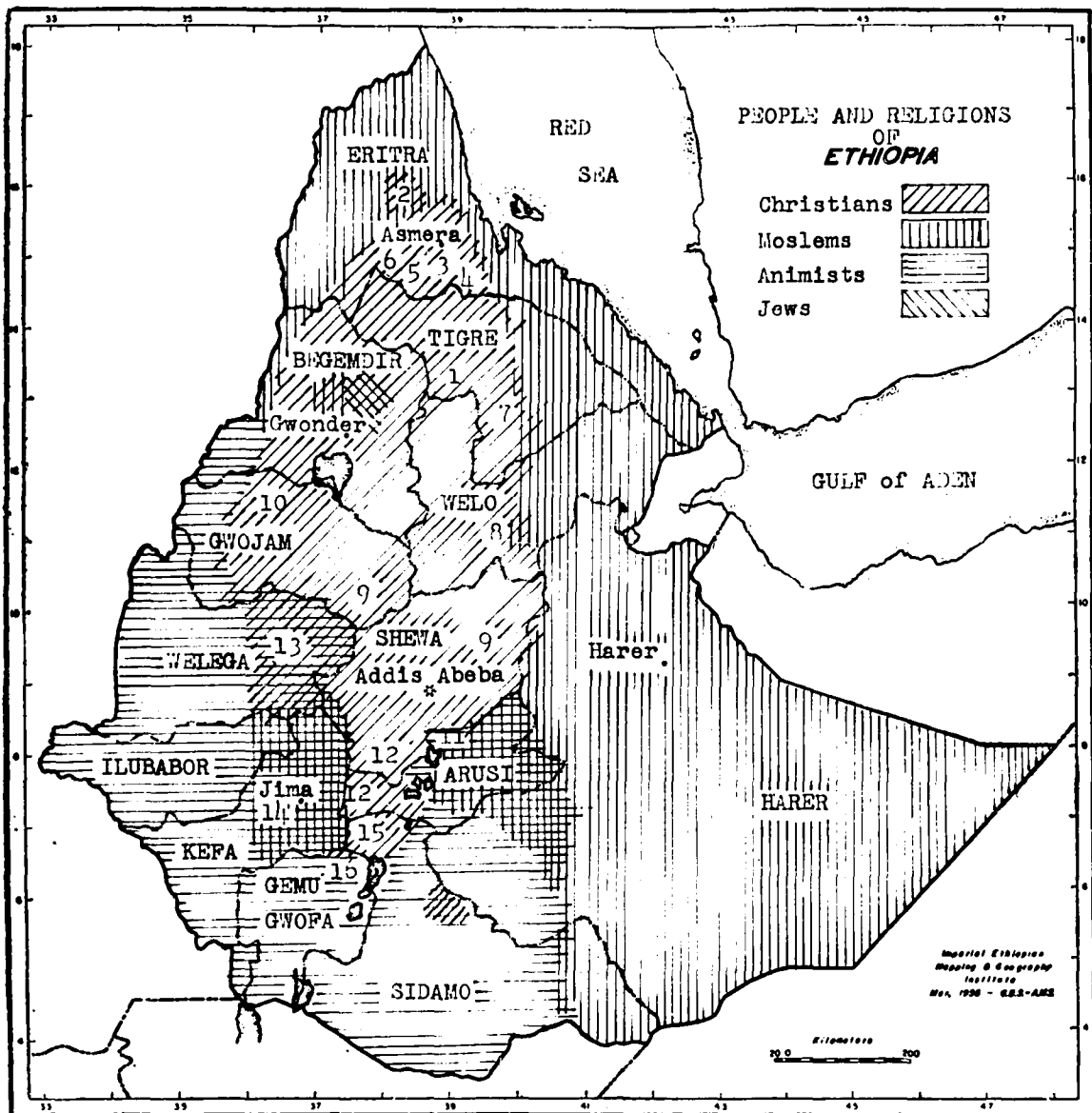


Table 2. Major tribes of the Coptic Christian population in Ethiopia^a

Section of the Central Plateau					
North		Central		South	
Name of tribe	Approximate location in Ethiopia ^b	Name of tribe	Approximate location in Ethiopia ^b	Name of tribe	Approximate location in Ethiopia ^b
Akele	3	Agau	10	Kafficho	14
Bilen	6	Amhara	9	Kambata	15
Guzai	4	Galla of Shewa	12	Kunama	17
Hamasen	2	Galla of Welega	13	Salamo	16
Saho Danakil	7	Galla of Welo	8		
Serai	5	Gurage	11		
Tigrean	1				

^aAdapted from William H. North. Ethiopian Church and the development of the country. Addis Abeba, Ethiopia. (Unpublished research). August, 1954. p. 3.

^bSee Figure 3.

necessarily indicate the true number of Amharas because the language is used in schools and is therefore spoken by many non-Amharas.

The Galla tribes as a group form a sizable block, possibly one-third of the entire population.¹ Historically, the Gallas were skillful horsemen and fierce fighters. Through

¹Ibid.

the course of time, they have become tillers of the soil and are now largely settled farmers. Although the Galla population is concentrated in the three areas shown on the map, it is represented in nearly all parts of the country. Dietrich¹ has located 52 Galla tribes which he classified as basic cultural units.

That part of Ethiopia situated between the highlands and the eastern border of the country is strongly Moslem. Here also, there are many different tribes. A survey of their manner of living, customs, and dialects is beyond the scope of this writing. One thing, however, is common to nearly all tribes of this lowland area: They are nomadic. Live-stock herds provide the main source of income.

West of the highlands there are found numerous tribes of Animists often called Shankeli. The latter is an undiminutive term which means "black men" in Amharic. There are at least 25 tribes of Shankeli. These do not constitute the whole of the Animist population.

Language

From the educational standpoint, it is advantageous to classify the inhabitants of the country on the basis of language. A fairly accurate breakdown can be made in this manner.

¹Dietrich, op. cit.

There are now more than 50 languages and dialects in Ethiopia.¹ Most of them belong to one of three language families, viz., the Semitic group, the Hamitic group, or the Nilotic group. The first was brought to Ethiopia by invading Arabs from southern Arabia. The Hamitic group are considered indigenous to Ethiopia.² The Nilotic-speaking people now inhabit the western part of Ethiopia. They may have originated there, or they may have moved into that territory from elsewhere.

The principal Semitic languages are Amharic, and Tigrina. The latter is spoken by a relatively small proportion of the population. Amharic is related to Arabic and has 33 letters each of which may combine with seven vowels. In addition, there are 34 diphthongs. The language is relatively difficult to learn. In its present state, Amharic is inadequate for the expression of many technical terms. As a result, many words have been borrowed from other languages. There is, at present, no satisfactory system of transliteration between Amharic and western languages.

The most important language of the Hamitic group is Galla, of which there are at least three major variations and

¹William L. Wrinkle. Language in education in Ethiopia. Report submitted to Ethiopia-United States Cooperative Education Program. Addis Abeba, Ethiopia. (Mimeo.) December, 1953. p. 3.

²See an earlier section. pp. 5-7.

17 dialects.^{1,2} It is spoken by approximately one-third of the Ethiopian people dispersed in nearly all parts of the Empire.

Somali, the second Hamitic language, is used exclusively by most of the Moslem people inhabiting the horn of Ethiopia which includes most of Harer Province. Most of the people using this language are nomadic. They number about 1.5 million.¹

There is one other Hamitic language which is relatively widely used. This is the language of the nomadic Danakil and Saho tribes inhabiting the Danakil Plains bordering the Red Sea. Like almost all other languages in Ethiopia, it has numerous dialects.¹

Little is known of the Nilotic languages or the people that use them. However, it is believed that such languages may be used by from one to several million people.

Regardless of the manner in which the inhabitants of Ethiopia are classified, it is evident that they are presently divided into many diverse tribes. They have neither a common religion nor a common language. The language problem in education is an enormous one. Although Ethiopians are rather linguistically inclined, there is a real problem

¹Myhre, op. cit. p. 1.

²Dietrich, op. cit.

securing teachers who are sufficiently fluent in two or more languages to carry on their teaching responsibilities. Many pupils must learn a new language in order to go to school. The printing of materials and the use of radio are made very difficult.

Government

The Government of Ethiopia is highly centralized and is directly involved in every major developmental undertaking in the country. A description of its general features and its operation is, therefore, appropriate. Consideration will be given to the administrative organization and to the revised Constitution which has recently been granted.

Administrative organization

The present Government of Ethiopia may be described as a limited monarchy although the power of the Emperor is subject to few limitations. The Emperor, His Imperial Majesty Haile Selassie I, is assisted in his duties by the ministers and vice ministers of 13 governmental departments.^{1,2} This

¹It should be pointed out that there is presently no minister appointed for the Ministry of Education. The duties of this office are taken over by the Emperor, himself.

²Imperial Ethiopian Government. Ministry of Commerce and Industry. Economic progress of Ethiopia. Ministry of Commerce and Industry. Addis Abeba, Ethiopia. 1955. p. 106.

advisory group is called the Council of Ministers.¹ Within recent years, the Council has been given increasing responsibility in matters of policy making. Likewise, the authority and responsibilities of the various ministers appear to be increasing with the passage of time. This is perhaps natural in light of progress which has been made and in light of the increase in activities which has resulted from the country's expanding economy.

Laws are formulated in Parliament, which is made up of the Senate, or Upper House, and the Chamber of Deputies, or Lower House. However, all such legislation must be approved by the Emperor before it becomes law.

Governmental functions, particularly those dealing with administration and police organization below the national level, are largely the responsibility of the Minister of Interior. The country, exclusive of Eritra, is divided into 12 provinces. At the head of each is a governor-general. Provinces are divided into awrajas of which there were 72 in 1954.² Each is headed by a governor-general who is subordinate to the individual bearing the same title at the provincial level. The awrajas are divided into weredas. There

¹Perham, op. cit., p. 88.

²Gordon B. Shilz. Political geographical terms helpful in the field. Office memorandum distributed among staff of United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Mimeo.) March, 1954.

were 349 of the latter in 1954. Each of these divisions is headed by a governor. Below this in rank and power is the governor of the miktil-wereda. As of 1954, there were 1398 such divisions in that part of the Empire outside of Eritra. Subordinate to the miktil-wereda governor is the balabat, or group chief, who is chosen by the people of the community which he represents but who is also appointed to office by the government. The community governed by the balabat may be further divided into units based upon the number of houses. The smallest division of this type is the amba which includes from one to five houses.¹ Thus, it can be seen that the administrative organization of the Ethiopian Government extends from the Emperor to the individual households.

Under the highly centralized administrative organization, field workers have found it necessary to seek clearance for proposed activities at the ministry level before asking the cooperation of the provincial governor. The latter must be interviewed before proceeding to officials at the next level, etc. Having presented his plan to officials at all echelons, the fieldman may expect to have the full cooperation of the balabat and local people. It probably could not be secured by other than this means.

The Constitution

¹Ibid.

A written Constitution was first granted in 1931 when the present Emperor came into power. This was superseded by a more liberalized Constitution issued in November, 1955. The new Constitution contains 131 Articles dealing with a wide variety of subjects.

The opening 25 Articles fix the succession to the throne and enumerate various details related thereto.¹

Articles 26 through 36 enumerate the powers and prerogatives of the Emperor.² In addition to those previously mentioned, the following are of note: (1) The Emperor has the power to appoint and dismiss ministers and most other officials, including the members of the Senate, or upper legislative branch. (2) He has the power to dissolve Parliament. (3) He has the power to grant land and property in recompense for faithful service to the Crown. (4) He has the right and duty to proclaim all laws after they have been passed and to maintain justice in the courts.

Articles 37 through 65 describe the rights and duties of the people. Certain of these will be mentioned.³ Under the new Constitution the individual has among others the

¹Imperial Ethiopian Government. Proclamation No. 149 of 1955. Made public in Negarit Gazeta of November 4, 1955. Ministry of Pen. Addis Abeba, Ethiopia. pp. 4-8.

²Ibid., pp. 8-9.

³Ibid., pp. 9-12.

following rights and duties: (1) No one may be denied protection of the laws, and no one within the Empire may be deprived of life, liberty, or property without due process of law. (2) There may be no discrimination amongst Ethiopian subjects with respect to the enjoyment of all civil rights. (3) Freedom of speech is guaranteed throughout the Empire in accordance with the law and correspondence may not be subject to censorship except in time of national emergency. (4) Everyone in the Empire shall have the right to present petitions to the Emperor. However, no one shall have the right to bring suit against the Emperor. (5) Everyone has the duty to exercise the right of suffrage which is conferred upon them by the Constitution.

Articles 66 through 75 pertain to ministers of the Empire. Specific statements are included concerning duties toward their offices, other ministries, and the Emperor. Ministers are required to take an oath of fidelity to the Emperor and to the Constitution.¹

There are 17 regulations which pertain specifically to the legislative bodies, the Senate and the Chamber of Deputies.² The following stipulations are set forth: (1) A regular session of Parliament is to be scheduled for 218 days each year. (2) Meetings of either Chamber are to be

¹Ibid., pp. 12-13.

²Ibid., pp. 14-16.

open to the public except when requested otherwise by the Prime Minister or when voted otherwise by a Chamber. (3) Every member of Parliament must take an oath of loyalty to the Emperor and to the Empire. (4) No action or charge may be brought against any member of Parliament for words uttered, or written statements submitted by him at any meeting of either Chamber. (5) Laws may be proposed by either or both Chambers, by the Emperor, or by 10 or more members of either Chamber except proposals involving an increase in governmental expenditure or an increase in a tax rate. The latter must always be introduced through the Chamber of Deputies who are, henceforth, to be elected by the people. (6) All regulations must receive the approval of the Emperor before they become law. (7) During the time when Parliament is not in session, urgent legislation may be decreed by the Emperor. Such regulations may be abolished by Parliament following its reconvention.

Perhaps the most significant feature of the new Constitution is the provision for the election of members of the Chamber of Deputies.^{1,2}

The first election to the Chamber of Deputies shall be completed within 2 years from entry into force of the present Constitution . . .

¹Ibid., p. 14.

²Ibid., pp. 16-17.

Provision is made for the country to be divided into electoral districts each of which is to contain about 200,000 inhabitants. As indicated, each such district is to be represented by two Deputies. In addition, each town exceeding 30,000 in population is entitled to one Deputy and an additional Deputy for each 50,000 inhabitants in excess of the original figure. According to the Constitution, members to the Chamber of Deputies are to be elected for a period of 4 years. All Ethiopian subjects by birth who are at least 21 years of age and who are regularly domiciled in an electoral district may vote. Balloting is to be secret.

As set forth in the Constitution, members of the Senate may not number more than half that of the Chamber of Deputies. The former are to be appointed by the Emperor, and serve for 6 years. Among other qualifications, to be eligible for appointment to the Senate, an individual must be:¹

. . .a Prince or other Dignitary, or a former high governmental official, or other person generally esteemed for his character, judgment and public services.

The remaining articles of the Constitution respect the judicial system, government finance, and certain matters of a general nature.² One article of particular importance has

¹Ibid., pp. 16-17.

²Ibid., pp. 18-20.

to do with the conservation of natural resources. It will be quoted in part.¹

The natural resources in the waters, forests, land, air, lakes, rivers and ports of the Empire are a sacred trust for the benefit of present and succeeding generations of the Ethiopian people. The conservation of the said resources is essential for the preservation of the Empire. The Imperial Ethiopian Government shall, accordingly, take all such measures as may be necessary and proper, in conformity with the Constitution for the conservation of the said resources.

Throughout all branches of Government, heavy reliance has been placed upon advisers during the past 15-year period. Many countries and almost as many types of governmental systems are represented among the advisers in the various branches. This should prove beneficial to Ethiopia because her officials will have had an opportunity to draw from broad experience in further developing their own government.

From the foregoing it is evident that progressive steps have been taken to modernize the Ethiopian Government. Obviously not all of the provisions of the Constitution can be put into effect immediately. The liberalizing effect that should result from the implementation of the provisions of the Constitution should be beneficial to education.

¹Ibid., p. 20.

Ethiopian Orthodox Church

The Ethiopian Orthodox Church, or Ethiopian Coptic Church, as it is more commonly called, has been described as one of the most powerful institutions in the country.¹ It is directly involved in education and in agriculture. The discussion concerning the Church will be divided into four parts including background and organization, center of influence, relationship to the people, and reformative measures underway.

Background and organization

The origin of the Ethiopian Church can be traced to the early part of the fourth century. The early Church held a close but subordinate relationship to the Egyptian Coptic Church. It continued this relationship through the great controversies over the nature of Christ and became one of the group of eastern orthodox churches holding to the Monophysite doctrine of a Single Nature of Christ. This doctrine was denounced by the Council of Chalcedon in 451 A. D.²

The Ethiopian Church has, as a result of its close

¹North, op. cit., p. 2.

²Douglas O'Hanlon. Features of the Abyssinian Church. Society for promoting Christian knowledge. Northumberland Avenue, London, England. 1946. p. ix.

association with the Egyptian Church, adopted the latter's doctrine, ritual, calendar, and customary practices. Despite this fact, however, the Ethiopian Christians have developed many of their own religious customs and practices and thus have created a distinctly national church.¹ In 1929 an agreement was worked out between the two churches whereby, for the first time in history, Ethiopians could be consecrated as bishops in their own church.¹ However, no authority to consecrate other bishops or priests was granted to Ethiopians at that time. Not until July 13, 1948, following a complete separation of the Ethiopian Church from the Mother Church could Ethiopians consecrate their own bishops. However, as of that date, the Ethiopian Church became autonomous.

In Ethiopia the Emperor is the head of the Church as well as the Government. From 1948, when the Ethiopian Church became independent, until the revised Constitution was proclaimed, in 1955, the archbishop, whose popular title is abuna, was appointed by the Emperor. However, under the revised Constitution, provision was made for the archbishop and bishops to be elected by representatives of the clergy and laity.

Under the archbishop there are 13 bishops, one for each province except Shewa, one for Eritra, and one for the

¹North, op. cit., p. 5.

Church's mission to Jerusalem. The office of the bishop of Shewa Province is retained by the archbishop.

Organization at the local level consists of ordained clergy and varying numbers of lay workers, both young and old. One of the principal laymen is the alaka who has ultimate authority over sizable land holdings controlled by the individual church.

Priests are key individuals in terms of the Church's relations with the people. They are numerous; some churches have been reported to have 200 or more. In the past, little training has been required for admission to priesthood. Writers have described the priests as "ignorant," "degraded," or "primitive." The frequency with which such terms are used in describing the priests would indicate that there may be justification for their use.

Center of influence

It has been estimated that the Christian population now constitutes a slight majority of the total population of 18,000,000.¹ The remainder is made up of Moslems, Animists, Jews, and followers of various faiths represented among missionary groups. The list probably represents in descending order the number involved. The general area where each predominates is shown in Figure 3 on page 33. The centers

¹Ibid., p. 2.

or strongholds of the various groups can be determined with considerable accuracy. However, it is difficult to sharply outline the fringe areas where an overlapping of groups is frequently observed. It will be noted that the Christian stronghold is roughly defined by the outline of the Central Plateau.

Relationship to the people

The Church has a very real and continuous influence upon the lives of most Ethiopians who live within its center of power. Baptism in the form of triple immersion is a major religious practice and is required of all who are to be affiliated with the Church. Boys are baptized 40 days after birth, and girls 80 days after birth.

For those in many rural communities and for others desirous of such instruction, the Church offers a certain amount of schooling. Traditionally, the Church was the sole provider of training. There are an estimated 10,000 church schools in Ethiopia.¹ However, they appear to be largely a recruiting ground for church workers.²

O'Hanlon² has given the following description of church schools:

¹Technical Cooperation Service to Ethiopia. Fact sheets on Ethiopia. Data compiled by staff of Service. (Mimeo.) May, 1954.

²O'Hanlon, op. cit., p. 13.

. . . The buildings are small and dark, and for the most part ramshackle, with no attempt at uniformity of design. The hours are long, writing materials, books, and furniture scanty. Lessons, therefore, are largely oral and the degree of memorization is high.

The Church has rather binding regulations governing marriage. Polygamy, which was an important part of pre-Christian tribal life, has been outlawed. For all practical purposes it is impossible for those who have been married in the sanctuary of the Church to obtain a divorce. Contrariwise, divorce is readily obtainable following civil marriage. Because of this, few church marriages are performed. None who have been married outside of the Church--even though the ceremony may have been performed by a priest--may enter the sanctuary. Therefore, the vast majority of the people congregate outside of the Church proper during services. Separated from the priest by the thick stone wall of the octagonally-roofed Church and by a distance of perhaps 100 meters, it is impossible to imagine that the passive spectator receives more than negligible inspiration from his attendance.

To the Ethiopian Copt, fasting is the essence of religion. Children under the age of seven are not expected to fast; for all others it is considered essential. A fast usually consists of abstaining from animal food products including milk and eggs for a period of up to 48 hours in

length. In all, there are 267 days of fasting per year prescribed by the Church.¹ However, only the most pious priests observe all of them. The average Copt must adhere to about 165 days of fasting. Thus, a farmer who is a Copt is expected to work for the equivalent of about 5.5 months with little protein food.

One or more days of feasting usually follow each fast. In addition, there are 11 regular feast days each month. Therefore, when Ethiopians are not fasting, they are usually feasting. This is extremely hard on the health, and it also materially reduces the individual's capacity for mental and physical work.

The Church has a very direct relationship with many rural people who have made arrangements to till church-owned land. The church has become a major landholder as a result of land grants made by former emperors. It not only controls a considerable amount of land but much of the land appears to be of the best in Ethiopia. This topic will be discussed at length in a later section.²

There are various ways in which the Church indirectly influences the people. One example is the effect upon the Government. History records a number of instances in which

¹North, op. cit., p. 15-16.

²See pp. 147-149.

pressure from the Church was enough, either singly or in combination with one or more factions, to secure the removal of an emperor. This has happened since 1913. Furthermore, there appears to be among government officials, today, a certain feeling that nothing should be done that will place them in disfavor with the Church. This "fear" of the Church has far-reaching repercussions.

Reformative measures underway

The Emperor has recognized the need for reform within the Church and has instituted a number of changes. The first was brought about as a result of Decree Number 2 issued on November 30, 1942. This decree entitled "Regulations for the Administration of the Church" contained 12 parts. Six concerned the administration of church property and finances. The remainder concerned various other matters relating to the Church.¹

Under the former system, cash and kind returns from Church land could be utilized by the individual churches. However, under the new regulation, all collections made from land must be turned over to a Central Church Treasury. From this, allocations are made to individual churches in accordance with accepted budgetary practices.

¹Imperial Ethiopian Government. Decree Number 2 of 1942. Made public in Negarit Gazeta of November 30, 1942. Ministry of Pen. Addis Abeba, Ethiopia.

The second change was the substitution in connection with church activities of Amharic, the native language, for Geez, the traditional language of the Church. The substitution was necessary because Geez was understood by very few people and not all of the priests. Printed material including the Bible has now been made available for use by the people.

Another improvement which has been brought about is the establishment of the Theological School. This institution has been designed as a center for the education of priests. It was opened in 1944. It is administered by the Ministry of Education.¹

A fourth reformative measure underway is the work being carried on by the Bible Church-men's Missionary Society. This effort is unique in that it seeks to bring reform from within the Church itself. The activity is sponsored by a group of Anglican churches. Unfortunately, the work of this organization has been held in great suspicion by the Ethiopian Church and, as a result, little has been accomplished.

It is evident from the foregoing brief discussion that the Ethiopian Coptic Church is inextricably entwined in the lives of its followers. To the uneducated person in a rural community, the Church is a mysterious force permeating his

¹Imperial Ethiopian Government. Ministry of Education. Yearbook. 1951-1953. Addis Abeba, Ethiopia. 1954.

whole life. He is obliged to abide by the ancient doctrine or face what might be termed excommunication. Unfortunately, progressiveness which is so desperately needed in rural communities, as well as elsewhere, is not generally favored by the Church. Although certain reforms have been instituted, further change is needed. It would appear, in this connection, that reform should come from within rather than from without.

Transportation and Communication

The irregular surface of the Central Plateau and the surrounding terrain has contributed greatly to the isolation of groups within the borders of Ethiopia. The shipment of supplies and produce, the movement of people, and the exchange of ideas have all been hampered by the lack of transportation and communication facilities. To a considerable extent, the expansion of education is dependent upon the development of these facilities. A brief statement concerning the most-used methods of transportation and communication will be given.

Rail transportation

A railroad has been in operation between Addis Abeba and Jibuti, French Somaliland, since July 7, 1917. It has been operated by a Franco-Ethiopian concern. Fairly good

freight and passenger service is offered; however, the rates are considerably higher than for similar truck and bus service. The pattern of the transportation system in Ethiopia can be seen from Figure 4 on page 57. Rail service is dependent upon truck transportation to move supplies to and from the inland terminus of Addis Abeba.

Air transportation

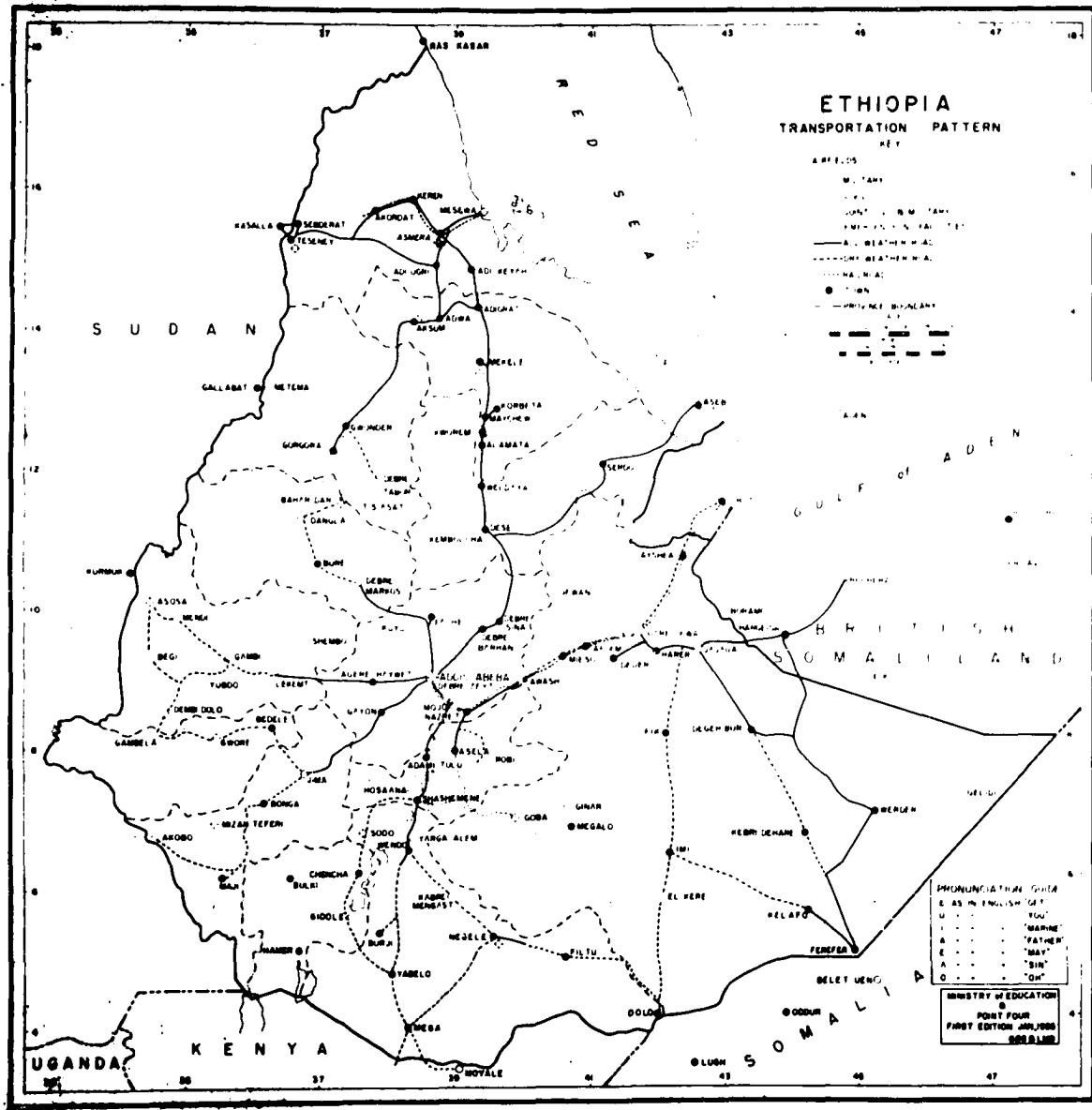
As a result of an agreement signed in 1945 by representatives of the Imperial Ethiopian Government and the carrier, Trans-World Airlines, air service was established inside Ethiopia and between it and surrounding countries. The Ethiopian Airlines was, thereafter, created as a subsidiary of the aforementioned carrier.

Freight and passenger flights are now scheduled among 22 locations within the Empire. Some points are serviced only once per week while others have one or more daily flights. International flights connect Ethiopia with points to the north, east, and south. Sizable quantities of certain agricultural products, particularly coffee and chat (a stimulant crop) are transported by air from small markets to central markets.

With the advent of air transportation in Ethiopia, many points which had previously been almost completely isolated became readily accessible. Cargo and passenger planes

Figure 4. Transportation pattern¹

¹Imperial Ethiopian Mapping and Geography Institute. Transportation pattern. First edition. Map made and published by Institute. Addis Abeba, Ethiopia. January, 1956.



crossed with ease the unbridged rivers, the broken and irregular escarpment, the stretches of roadless plateau country, and the hot sands of the desert. In 1954 the Ethiopian Airlines carried 9,141,000 pounds of freight. Part of this was coffee which was brought from isolated markets to truck and rail centers. Some of it was chat, a highly perishable stimulant crop marketed hundreds of miles from the production centers. Sizable quantities of hides and skins were also transported.

Road transportation

The limited network of primary roads now serving Ethiopia is largely an improvement and expansion of military roads built by the Italians during the period from 1935 to 1941. Roads valued at Ethiopian \$300,000,000 (United States \$120,000,000) were left by the Italians in 1941.¹ There was one main road from north to south and a second from east to west. In addition, there were a limited number of branch roads built. Most of these served the Central Plateau. Few secondary roads were constructed.

At the request of the Imperial Ethiopian Government, the International Bank for Reconstruction and Development in

¹Rex Anderson. Highway transportation in Ethiopia. Report presented at staff meeting of United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Oral). March, 1954.

1951 loaned funds for a 20-year program of road improvement in Ethiopia. Construction and maintenance under this program has been carried on by the Imperial Highway Authority which was established in 1951. This organization is staffed by United States engineers. A preponderance of United States equipment has been used.

The initial effort, following 1951, was devoted to the reopening of major roads which were closed as a result of military action or because suitable maintenance had not been provided. One of the main roads reopened was the Kembolcha-Aseb road which made possible the importation of materials at rates much below those in effect on the railroad.

After major roads were again passable, attention was diverted to improving the surface of several thousand kilometers of road throughout the Empire. No attempt was made to maintain all of the macadamized surfacing left by the Italians. Due to the very heavy loads which were common and to the nature of the rainfall, it was deemed advisable to attempt to maintain a traffic-bound crushed rock surface. Because of the cost involved, relatively few secondary roads have been constructed.

At the present time, Ethiopia has about 4500 kilometers (2795 miles) of all-weather road. Trucks can now make a round trip from the Capital to Aseb in slightly over 5 days. Coffee can be brought from Jima to Addis Abeba in one day.

Timber can be brought to the capital from Lekemt, Arusi, or from the northern Sidamo Province in little more than one day. But the situation is still far from ideal. A major proportion of the country's feeder roads are impassable except in the dry season. Many areas are inaccessible to other than a man on foot, a mule, or a four-wheel drive vehicle.

Communications

Menelik II introduced the telephone into Ethiopia. Before the end of his reign, communication between the capital and a number of outlying provinces had been established. However, in order for a message to be transmitted for more than a short distance, it had to be relayed from station to station.¹

Following the Italian Occupation, the Emperor created by proclamation, the Ministry of Post, Telephone, and Telegraph.² About 30 years later in 1952, His Majesty proclaimed the establishment of the Imperial Board of Telecommunications.² Both agencies were created for the purpose of developing communications services throughout the Empire. Funds beyond those provided by the Government were obtained through a

¹Imperial Ethiopian Government, Ministry of Commerce and Industry, op. cit., p. 63.

²Ibid., pp. 64-65.

loan from the International Bank for Reconstruction and Development. During the period from 1950 to date, much progress has been made.

Telegraph service now connects major cities in Ethiopia. The existing service is generally satisfactory, and rates are reasonable. On July 21, 1954, new radio-telegraph circuits, Addis Abeba to London and Addis Abeba to Rome, were opened.¹

Telephone service at the present time consists of long-line service connecting major towns and cities. With the exception of Addis Abeba, Asmera, Dese, Dire Dawa, Gwondar, and Jima, very few centers have local networks. Some of the large villages, of course, have no telephone or telegraph service. As of 1955, nine centers which had no telephone service had been provided with radio-telephone equipment. These included Aseb, Gwore, and Soddu.²

Aside from the aforementioned services, little use has been made of radio. A broadcasting station has operated on shortwave band in Addis Abeba but the signal has been of such strength that it can be heard only within the immediate vicinity.

From the educational standpoint, it would be highly desirable for the country to have at least one centrally-

¹Ibid.

²Ibid., p. 66.

located powerful transmitter. The station should have a sufficiently strong signal that reception would be no problem even with relatively simple and inexpensive receivers.

NATIVE AGRICULTURE

Agriculture is basic to the support of the Ethiopian economy. An estimated nine-tenths of the population live on the land and are therefore directly supported by agriculture.¹ Indirectly supported by agriculture is a portion of the remaining one-tenth including those employed in small industries which process agricultural products for domestic use, those employed in the transportation of agricultural products, and those who own land but who do not live on it.

Agricultural products make up the principal exports of Ethiopia. The value of the leading exports and the proportion of the total value of exports comprised by each for the year 1954 are given in Table 3. The value of most of the products itemized is Ethiopian \$2,000,000 (United States \$800,000) or more. However, the export value alone cannot be taken as a true indicator of the importance of agricultural products in Ethiopia because in some instances, using cereal crops as an example, a large proportion of the production is absorbed through home markets. Due primarily to the export of coffee, Ethiopia has maintained a favorable balance of trade during the five-year period immediately prior to the

¹International Bank for Reconstruction and Development. Current economic position and prospects of Ethiopia. (Publisher not given). Washington, D. C. 1954. p. iv.

Table 3. Agricultural exports of Ethiopia^a (for the year ending September 10, 1954)

Product	Value		Percent of total exports
	Eth.\$ ^b	U.S.\$ ^b	
Stimulants			
Coffee beans	112,370,922	44,948,369	63.4
Chat ^c	3,918,359	1,567,344	2.2
Other	1,733	693	^d
Hides and Skins			
Goatskins	6,924,091	2,769,636	3.9
Hides, raw	6,741,677	2,696,671	3.8
Sheepskins	3,611,802	1,444,721	2.0
Other and leather materials	25,650	10,260	^d
Oilseeds and oils			
Flax seed	5,199,765	2,079,906	2.9
Nug ^e	3,298,315	1,319,326	1.9
Other	5,443,902	2,177,561	3.1
Legumes			
Lentils	3,673,683	1,469,473	2.1
Horse beans	3,018,414	1,207,366	1.7
Haricot beans	2,489,492	995,797	1.4
Other	758,046	303,218	.4
Animal products including meat and poultry	2,762,654	1,105,062	1.6
Cereals & cereal products	2,454,481	981,792	1.4
Fruits and vegetables	1,153,671	461,468	.7
Other agri. products	7,633,152	3,053,261	4.3
Non-agri. products	5,711,116	2,284,446	3.2
Total	177,190,925	70,876,370	100.0

^aAdapted from data contained in Imperial Ethiopian Government. Ministry of Commerce and Industry. Quarterly bulletin 4, No. 1. Addis Abeba, Ethiopia. May, 1955. pp. 35-37.

^bFigures are rounded to nearest one dollar.

^cChat (*Celastrus edulis*) is a stimulant grown in Ethiopia.

^dLess than one-tenth percent.

^eNug (*Guizota abyssinica*) is an oil plant considered to be indigenous to Ethiopia.

time of writing.

A level of agricultural production resulting in export trade of sufficient volume and makeup to net a favorable balance of trade for Ethiopia is largely a reflection of the country's relatively rich endowment of natural resources. It is not due to a high level or even to a moderate level of technology in agriculture. On the contrary, Ethiopian agriculture is underdeveloped in comparison with western agriculture, even in comparison with that of the pioneering era in the United States. A few illustrations will serve to point out the backward nature of Ethiopian agriculture.

One outstanding indication of the underdeveloped nature of Ethiopian agriculture is the very limited use made of the wheel. Away from the cities and off the truck routes the wheel is rarely seen in use. In rural areas all products are carried by pack animal or by man. Although it must be granted that carts and wagons have not been used in many instances because there have been no roads, this cannot be cited as the sole reason for the limited use of the wheel because animal-drawn vehicles are rarely used in areas where roads have been constructed.

The underdeveloped nature of Ethiopian agriculture is further indicated by the crude tools and implements used by the Ethiopian farmer. They consist of a hoe, a type of heavy spade, a small hand scythe, and a wooden plow-type implement

drawn by oxen, the principal source of draft power. Each of the tools will be described briefly.

Nearly every farmer has one multipurpose hand tool which could be described as a short-handled heavy iron hoe. The tool is used for digging much as a hoe is used; however, being made of heavy iron, this tool can also be used as a cross-bitted axe. Another hand tool owned by the typical farmer is the hand scythe. The hoe and the hand scythe are usually made from unhardened metal and are of poor quality.

The most important implement owned by the farmer is his iron-pointed, plow-type implement which is drawn by oxen. Most nearly described as a walking plow which does not turn the soil but which stirs the soil much as does a cultivator, this implement serves many purposes. With the exception of the point which must be forged, the plow is made mainly of wooden parts and can be made by the farmer at very little cost. Weight is held to a minimum because the farmer believes a yoke of oxen can pull an implement no heavier than that which a man can lift in one hand.

Tilling unbroken soil or heavy soil is a very difficult and time-consuming operation with this implement because it does not turn the soil. Therefore, as many as three separate operations, each in a different direction, may be required to carry out the initial tillage operation. The plow-type implement is also used to open shallow furrows in and around

the plowed fields. The furrows may be used for drainage, in which case they will be placed at intervals of 4 to 8 meters (13.1 to 26.2 feet) paralleling the slope. They may also be used for irrigation, in which case they will be appropriately placed. The same implement serves to stir the soil and cover the broadcasted seed. During the growing season, it is used to rogue the crops to form rows. It is also used to cultivate corn, sorghum, and other row crops, although its use for this purpose often results in severe root pruning. The fact that one implement serves so many purposes precludes any desire on the part of the farmer to purchase a separate implement for each operation.

For breaking new land, or for turning a heavy sod cover such as would be produced by Bermuda grass, a special tool called wanata is sometimes used. This is a wooden pry bar having a two-pronged end, both points being capped with iron. In turning sod several men work as a team forcing loose a single piece of earth about one-half square meter in area and 6 to 8 inches in depth. From one to ten teams may work in the same field. The soil is entirely turned; however, it dries rapidly because of large open spaces left in the surface. Furthermore, an extremely rough seed bed is prepared and the cost per hectare is high even though laborers are paid at the rate of Ethiopian 75 cents (U. S. 30 cents) per day.

With few exceptions these are the tools used by the typical Ethiopian farmer. The entire lot can be purchased for no more than Ethiopian \$20 (U. S. \$8.00).

The family dwelling and the facilities constructed for handling livestock and storing grain on the farm are simple in the extreme. The typical hut, or tukul, is built of small sticks or poles laced to either a circular or square frame upon which is later attached a thatched roof. The walls of the hut may or may not be covered with mud plaster. Few such dwellings have windows or a chimney. Food is prepared on the open fire. Smoke filters through the thatched roof. A notable exception to this type of shelter is that used by a family belonging to a nomadic tribe. The typical shelter used in this instance is an umbrella-type roof made of tin or leather. The shelter is transported from place to place on the back of a camel. Either type of shelter, in many instances, is shared at night by family, chickens, and small animals. The tukul may stand alone on land owned or tilled by the farmer but is usually part of a small village located on or near the farm land.

No provision is made to shelter animals other than the very young and the sick which, in many instances, are housed overnight in the family dwelling. Some form of shelter would be desirable to protect animals from the long cold rains. Livestock fences do not exist except for pens thrown up near

the family dwelling to corral large animals overnight. Similarly, the usual place for storing grain is inside the family dwelling although other facilities are utilized. Occasionally, a large hopper-type basket of from 2 to 5 quintals (440 to 1100 pounds) capacity is erected on legs for use in storing grain.¹ The hopper is provided with a thatched cover. With any of these types of storage, grain is subject to moisture, insect, and rodent damage.

The cash income of most farmers is very low, probably less than Ethiopian \$100 (United States \$40) per year.² One reason for this, although by no means the only reason, is the subsistence-type operation carried on by many farmers. Except in isolated instances where mechanized farming is practiced, fields are small, often no larger than 1 or 2 hectares (2.5 to 4.9 acres) in size. One farmer may farm more than one field but still have a very low income because both yield and quality of most agricultural products are low. Crop and livestock production will be discussed in more detail in a later section.

Another illustrative point bearing out the underdeveloped nature of Ethiopian agriculture is that very few rural

¹One quintal is equal in weight to 100 kilograms.

²United Nations Food and Agriculture Organization. Report to the Government of Ethiopia on small agricultural implements. No. 194. Food and Agriculture Organization. Rome, Italy. (Mimeo.) 1953.

people have had any formal education. This is particularly true of the older generation. The illiteracy rate for the country as a whole is estimated to be as high as 96 percent.¹ For the farm people the rate is probably very near 100 percent. Prior to 1950 there was practically no educational opportunity for rural people. During the period from 1950 to date there has been only negligible opportunity. Most rural children between the ages of five and 15 spend the day herding livestock or guarding the grain fields against birds.

For the purpose of further description, the agriculture of Ethiopia will be divided into sections which include soils, crops, grassland and pasture, and livestock. It is not the intended purpose of this study to treat these topics in great detail. Rather, a cursory description of native agriculture is presented to offer a picture of the agriculture which is the livelihood of the great majority of Ethiopians and the primary basis of their economy. It is further intended to describe, in their proper setting, some of the weaknesses in agriculture which could be strengthened through a program of agricultural education.

¹Technical Cooperation Service to Ethiopia. Fact sheets on Ethiopia. Data compiled by staff of Service. (Mimeo.) May, 1954. p. 2.

Soils

The soil regions of Ethiopia are shown in Figure 5 on page 73. Basic information concerning each region is given on the facing page. A brief description of each soil region will be given here with emphasis on type of agriculture supported, productivity, workableness, and erosion. The principal soil regions are the Red Sea Plains, the Central Plateau, the Blue Nile Valley, the Rift Valley, the Somali Plateau, the Crystalline Highlands, and the Sudan Plains.

Red Sea Plains

The shallow sandy soils of the Red Sea Plains are extremely arid for a major portion of the year and produce only enough vegetation to support limited grazing of nomadic herds. However, the soil is sufficiently fertile to produce crops under irrigation. This area is of relatively little importance from the standpoint of crop production.¹

Central Plateau

From an agronomic standpoint, the most important soils in Ethiopia are those found on the Central Plateau.² Most of

¹Imperial Ethiopian College of Agriculture and Mechanical Arts. First annual report. Addis Abeba, Ethiopia. (Mimeo.) January, 1954. pp. 6, 148.

²Imperial Ethiopian College of Agriculture and Mechanical Arts. Soils and Plant Science Department. First annual report. July 1, 1952--June 30, 1953. Addis Abeba, Ethiopia. (Unpublished typewritten rept.) pp. 13-14.

Figure 5. Soil regions of Ethiopia^{1,2}

¹Imperial Ethiopian Mapping and Geography Institute. Soil regions of Ethiopia. Preliminary edition. Map made and published by Institute. Addis Abeba, Ethiopia. 1954.

²Roman numerals denote soil regions described as follows:

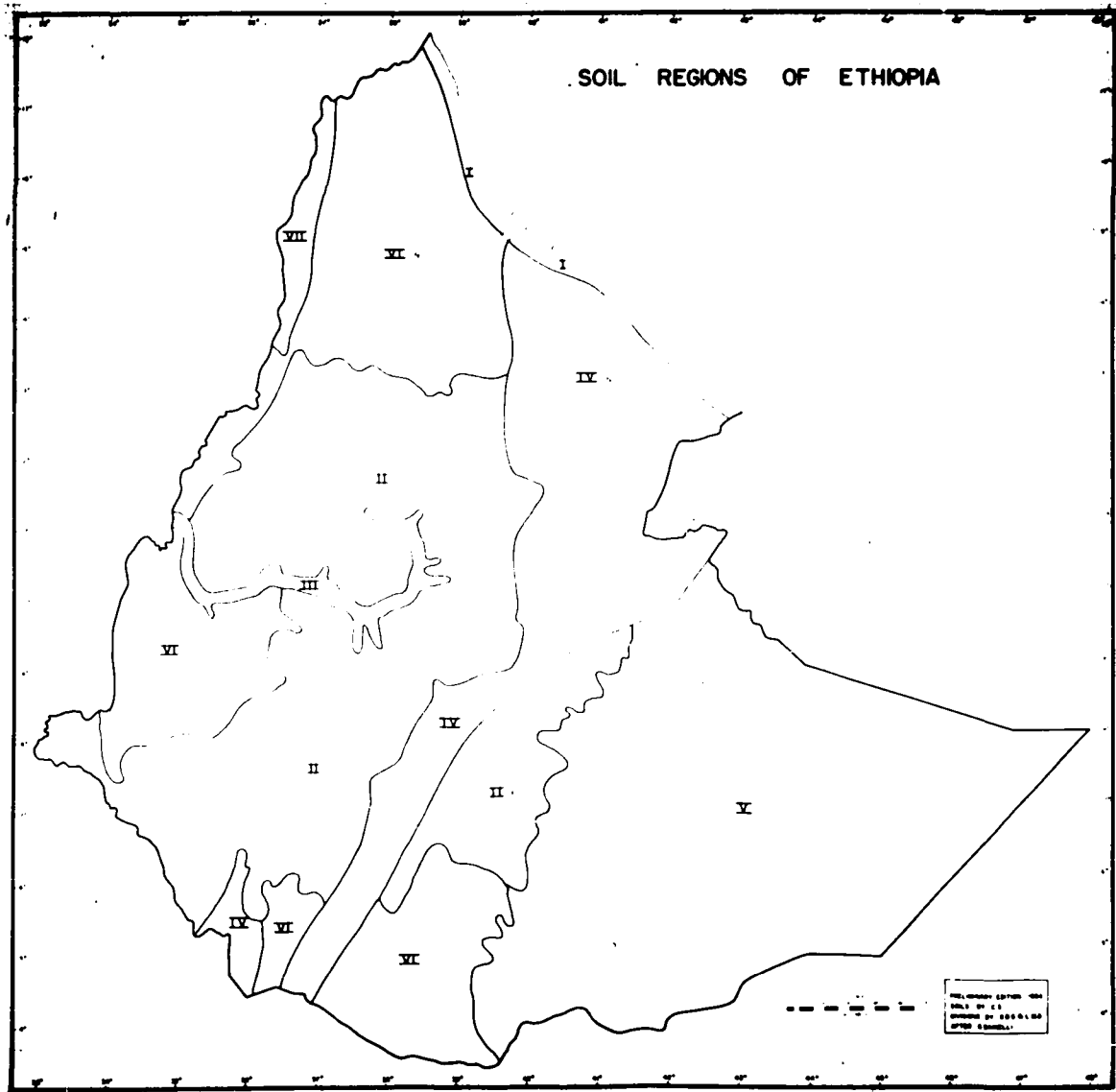
- I Red Sea Plains--Shallow, sands and desert
- II Central Plateau--

N-Shallow, red, yellow, grey, black clays S-Deep, red, brown, gray-brown clays E-Shallow, red clays	}	Lateritic
---	---	-----------
- III Blue Nile--Shallow, alluvials
- IV Rift Valley--

N-Shallow, brown-grey, desert S-Brown forest, steppe, desert	{
---	---
- V Somali Plateau--

N-Shallow, red lateritic S-Deep, sandy, steppe	{
---	---
- VI Crystalline Highlands--

N-Shallow, rocky, sandy S-Deep, red, lateritic	{
---	---
- VII Sudan Plains--Alluvial, steppe



the soils of this area contain a low percentage of sand and a relatively high percentage of clay. Some of the less dense soils are of a clay loam texture. Despite a high clay content, most soils of the Central Plateau have excellent structure. Except in the case of grey soils, which appear as a compacted mass of highly pulverized material, drainage is not a serious problem.

In the northern portion of the Central Plateau black clay soils predominate. The reason for the almost charcoal blackness of many highland soils has not been fully explained. It is difficult to explain the dark color on the basis of organic matter content, because soils are found which are extremely low in organic matter but which exhibit the characteristic black color. Due to their high clay content, the black soils crack badly during the long, dry season. The deep cracks permit the evaporation of soil moisture. As a result most of the Central-Plateau soils are relatively poor dry weather soils. Soil management practices which tend to conserve moisture and prevent cracking should be inaugurated.

The soils of the southern portion of the Central Plateau are deep and characteristically red or brownish red in color. On bottomland where drainage is poor the red color gives way to the aforementioned greyish appearance. The red and brown soils generally have excellent structure, are fertile, and

produce well.¹

In the eastern portion of the Central Plateau the soils generally are shallow and distinctly red or brown in color. Due to the improper use of much of the rolling land, gully erosion has become a serious problem in sections of this part of the Central Plateau.

The majority of the soils in the Central Plateau appear, on the basis of limited soil testing which has been done, to be fairly high in potassium, but characteristically low in phosphorus and nitrogen.² The low level of nitrogen is to be expected because very little organic matter is returned to the soil. Manure and straw are removed for fuel and feed. Sometimes, even the roots from the plow layer are removed. Legumes are not planted especially for the purpose of restoring soil nitrogen. The practices of planting legumes and rotating crops should be greatly expanded wherever conditions are favorable.

Soil erosion has become a serious problem on the Central Plateau as well as in other parts of Ethiopia. This is due to a number of factors which include the concentrated rainfall, the farming of steep slopes, the removal of crop residues from the land, the general practice of continuous

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., pp. 149-150.

²Ibid., p. 29.

cropping, and the frequent overgrazing of pastureland. The latter two points will be considered in the section dealing with crops.

A major cause of erosion on the highlands is the nature of the rainfall which is concentrated in a period of about three months beginning about June 15 and ending late in September. An estimated 80 percent of the rain falls during the months of July, August, and September. Although rain does not fall every day, sometimes as much as 5 inches of rain may fall in a single day. This concentration of rainfall causes extreme erosion.

Heavy run-off is particularly damaging to steep farm land. On the Central Plateau, some land exhibiting as much as a 60 percent slope is being farmed. Unfortunately, relatively steep land is being farmed in many cases while adjacent flat land is left in grass, the reason being that bottom or flat land is generally black soil which is heavy and difficult to plow.

Although, under these conditions all soils are subject to erosion, gully erosion of red soils is particularly damaging. The seriousness of soil erosion can be noted by observing, during the period of heavy rains, the silt-laden streams flowing from the Central Plateau, particularly the southern and eastern parts. Samples have been taken from the Awash River during a period of peak run-off. One such sample

showed that, by volume, the water contained about 20 percent silt.¹

Plowing the heavy clay soils of the Central Plateau is a difficult operation. This is due to the fact that plowing must be done during the dry season in order to permit planting to take place immediately prior to, or shortly after the beginning of the rainy season. Under these conditions the average tractor can draw only from one-half to two-thirds its rated number of plows. Large clods are turned up. Sometimes these are so large that they cannot pass between the beams of the plow. The per-hectare cost of plowing dry clay soils of the highland area is prohibitively high.

The traction force required to turn the heavy-textured soil is greater than one yoke of the average native oxen can deliver when a turning plow having a cut equal to, or greater than 10 inches is used. Using the conventional plow-type implement, native farmers and oxen are unable to stir more than 7 to 11 centimeters (2.8 to 4.3 inches) of the surface; and, therefore, fewer clods are turned up. Frequently, those which are brought to the surface remain there until after planting because the native farmer has no implement for use in smoothing and firming the seedbed.

Occasionally, a field is observed which has been planted

¹Ibid., p. 26.

on the contour or one which has been terraced. However, for every terraced or contoured field, there are many fields which have been abandoned because the soil had become too depleted to produce a satisfactory crop.

Mention should be made of a practice followed by farmers on the Central Plateau in an attempt to restore a certain amount of fertility to the soil. Between the operations of plowing and planting, roots are collected from an area of about 9 square meters (96.8 square feet), placed in a pile, and covered with soil gathered from the plow layer of an equal area. Before the root pile is completely covered, it is set smoldering by a piece of burning charcoal. The miniature volcano is then covered with soil and allowed to smolder about one week after which the soil is spread back over the surface from which it was taken. This process is repeated over the entire field. Ironically, the practice tends to destroy that which is needed most, namely, organic matter and nitrogen.

Blue Nile Valley

The Blue Nile Valley is relatively small. Its climate and soil differ sharply from that of the surrounding Central Plateau whose rocky surface, in the formation of the valley, has been incised to a depth of more than one-half mile by the eroding waters of the Upper Blue Nile and its tributaries. Alluvial deposits on the floor of this canyon have formed a

shallow, but fertile soil, the most fertile soil in Ethiopia. Unfortunately, the hot, humid, truly tropical climate of the Blue Nile Basin, produces extreme malarial conditions and prevents the fullest use of the fertile soil of this area.¹

The alluvial soils of the Awash and Omo river valleys display nearly as much fertility as that of the Blue Nile.

Rift Valley

The Rift Valley extends from the Red Sea southwestward into Kenya. Like the Blue Nile, the Rift Valley possesses, essentially, a climate within a climate; therefore, its soil is quite different from that of the surrounding Central Plateau. In the northern part of the valley a shallow brown-grey desert soil predominates. Vegetation is of the desert type. In the southern part, brown forest soils now support typical steppe vegetation.² Because of low rainfall this area has limited agriculture except where irrigation is possible. The herding of livestock is the main source of income for inhabitants of the Rift Valley.

Low rainfall and large herds of livestock have created a serious problem of overgrazing. Near water holes the grass has been completely denuded and deep trails have formed. Wind and water erosion are thus greatly accelerated, as is

¹Ibid., p. 6.

²Ibid.

evidenced by the fact that many livestock trails have become deep gullies.

Somali Plateau

The Somali Plateau is an extensive area in southeastern Ethiopia. The soils of the southern and major portion of this area are deep and sandy, having originated as marine deposits.¹ Although potentially productive, these soils support only steppe vegetation because of the low rainfall and high temperature. Progressing northward, there is a gradual shallowing of the sediment layer which gives way in the immediate area of Harer to a red lateritic soil.¹

In the northern portion, particularly in the vicinity of Harer, the loose, shallow, and continuously-cropped soil is very subject to water erosion. Countless gullies rib the hillsides, expose the parent rock material, and render a considerable proportion of this part of the Somali Plateau of little use for other than grazing. When the use of fertilizers is begun in Ethiopia this area will very likely be one of the areas to which they are first applied.²

At the present time the southern portion of the Somali Plateau is of little importance, agronomically. In the

¹Ibid., pp. 8, 150-151.

²Hi W. Staten. Soils in Ethiopia. Addis Abeba, Ethiopia. (Personal interview). February, 1954.

northern portion where rainfall averages about 600 millimeters (23.6 inches) annually, sorghum and chat are grown on dry land; vegetables and citrus fruits are grown under irrigation.

After nearly two and one-half years of deliberation, the Imperial Ethiopian College of Agriculture and Mechanical Arts was sited on the plateau near the city of Harer. Among other factors, the choice of a site was based upon geographic location, altitude, rainfall, and soil. The soil of the location is very excellent in many respects but it is principally of the red type. Therefore, in order to carry out experimental work on black soil it was necessary to establish an experimental station on the Central Plateau. Such a station has been established near the town of Debre Zeyt in Shewa Province.

Crystalline Highlands

The Crystalline Highlands, as can be noted from the map, are made up of three separate areas which are quite similar in soil type, although widely separated. The surface of this extensive area is predominantly mountainous although jagged peaks are less numerous than on the Central Plateau. Much of the surface shows the effects of erosion which has exposed granitic and other parent rock materials.

In the provinces of Sidamo and Gemu Gwofa, moderately fertile red soils of medium depth once supported considerable

forest cover at rainfall-favored elevations.¹ At prevailing lower elevations moderately fertile soils support bunch grass and scrub trees. Throughout much of this part of the Crystalline Highlands, the evaporation ratio is too high for the successful production of crops.

The soils of the western part of the Crystalline Highlands, in portions of the provinces of Welega and Ilubabor, are deep, red, lateritic soils which support, under relatively high rainfall conditions, a dense tall grass cover with some forests including bamboo and coffee.² There is considerable possibility for the expansion of agriculture in this area. At the time of writing, a large part of the food staples used in this area is imported overland and also by river barge.²

The soils of the Eritran Highlands, or northern portion of the Crystalline Highlands, are shallow, rocky, and very sandy. Certain of them are acid.³ This relatively infertile soil will support typical steppe vegetation at low elevations and barley and wheat at more favored elevations. Crop yields

¹Ferdinando Quaranta. Ethiopia, an empire in the making. P. S. King and Son, Ltd. 14 Great Smith Street, London, England. 1939. p. 12.

²William J. Beck. Agriculture in southwestern Ethiopia. Report presented at staff meeting of United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Oral). March, 1955.

³Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., pp. 8-9.

are low.

Long ago all trees were cut from this area. Now, in the absence of wood for use as fuel, all crop residues are removed from the soil. As a result, erosion has become a serious problem and fertility has fallen to the lowest found anywhere in Ethiopia. Limited observation would indicate that in addition to the need for liming, the Highland soils are deficient in nitrogen and phosphorus. There may also be a general deficiency of potash. Eritran farmers, who at best are poor, have through the course of centuries terraced a considerable part of the rolling land in an effort to retain the limited supply of water which does reach their fields in the form of rainfall. A small part of the land is irrigated. Extensive soil building practices should be introduced in Eritra. If chemical fertilizer can be produced locally, and there is some possibility of this, it also should be used. Even after benefiting from improved practices the soils of Eritra may be considerably less productive than those in other highland parts of Ethiopia.

Sudan Plains

The Sudan Plains are a long strip of lowland situated inside the Ethiopian border in the provinces of Eritra and Begemdir. The alluvial soil of this area is fertile and extremely productive when sufficient water is available. Rainfall ranges from about 600 millimeters (23.6 inches) in the

southern part to 20 millimeters (7.9 inches) in the northern part and is insufficient to support better than arid or semi-arid vegetation. The evaporation ratio far exceeds the precipitation. Therefore, in order to successfully produce crops, irrigation is necessary. Most of the water of the Gash River is used in irrigating a part of this strip. In the future there may be some possibility of using water from the Tekeze and Barka Rivers for irrigation.¹ The principal crops grown here are cotton, sorghum, corn, and citrus fruits.

A few summary statements may serve to conclude this discussion concerning soils in Ethiopia. A wide variety of soils and a corresponding variation in climate make possible the growing of many different crops, most of which are marketable outside of Ethiopia. The black soil found mainly in the central and northern part of the Central Plateau and the red soil found mainly in the southern and southwestern parts of the Central Plateau are friable and highly aggregated soils. They take up water readily during time of rain but give up rapidly much of the water held in the surface layer. They are, therefore, relatively poor dry-weather soils.

Rainfall is highly seasonal in most sections of Ethiopia. On the Central Plateau, 80 percent of the rain falls during the months of July, August, and September. For this reason most crops grown on the Central Plateau are produced on

¹Ibid., pp. 9, 151.

moisture stored in the soil. Therefore, it would be advisable to inaugurate soil management practices which would conserve soil moisture and prevent cracking of the soil.

Erosion is probably the most serious problem with soils in Ethiopia at the present time. The rate of erosion is increased by the torrential rains which are common during the season of heavy rain, extreme overgrazing in many parts of the country, the removal of crop residues from the fields, the farming of steep hillsides, and the limited adoption of conservation practices including green manuring, the rotation of crops, and the planting of legumes.

Crops

The crops of Ethiopia will be considered in six groups: namely, cereal crops, stimulant crops, oil crops, legumes, fiber crops, and other crops, including fruits and vegetables. These will be treated in the order mentioned. Only the more important crops in each group will be given individual consideration. A number of the crops grown in Ethiopia can be classified into two or more of the aforementioned groups. False banana (Musa ensetta) is an example. This crop, which grows wild as well as under cultivation, is used primarily for fiber, but it is used for food also. For purposes of this study, false banana will be categorized as a fiber crop. Similarly, other crops will be categorized according to their

principal use.

For purposes of identification the common English name will be used where possible. If no English name is known the Amharic name will be substituted. To aid in the identification of less common plants, the scientific name will be included. Throughout the discussion emphasis will be on crops which are a part of the native agriculture. Crop research will be dealt with in another section. Attention will be given to the general importance and use made of the crop, to cultural practices, particularly malpractices followed in growing the crop, and to problems pertinent to the growing of the crop under conditions found in Ethiopia.

Cereal crops

The principal cereal crops grown in Ethiopia are lovegrass, sorghum, barley, corn, and wheat. Oats also is grown but it is coarse and is not used extensively as a food. Few, if any, crops are grown in Ethiopia solely as feed crops.

Lovegrass, or tef, is an annual used for making an unleavened bread called injera. Although other grains are used in making injera, lovegrass is the preferred grain. For this reason it is considered to be the national bread grain. Both red-seeded and white-seeded lovegrass are grown. The latter (Eragrostis Abyssinica) produces a whiter bread, is therefore preferred, and sells for about 20 percent more than the

red.¹

Although lovegrass is widely grown in Ethiopia, it yields best at an altitude of about 1830 meters (6,002 feet) where rainfall and temperature are moderate. It will tolerate a wide variation in altitude. Lovegrass is grown on brown, red, and black soils but usually yields best on black soil which is, generally, the most fertile soil in Ethiopia. However, the difference in yield between black soil and red soil is minimized by the extreme degree of cracking which accompanies the loss of moisture from black soil during the dry season. Where conditions are suitable, farmers plant lovegrass in preference to other cereals because it yields well and is sold for more than other grains.

On the Central Plateau where there are two periods of precipitation, i. e., light rain during the period from February to April and heavy rain during the period from July to September, lovegrass is usually planted early in July. The seed is broadcast by hand on a seedbed which, in nearly all cases, is rough and poorly prepared. The small seed renders uniform seeding extremely difficult. Staten¹ has reported that some farmers follow the practice of driving

¹Imperial Ethiopian Government. Ministry of Commerce and Industry. Quarterly Bulletin 4, No. 1. Addis Abeba, Ethiopia. May, 1955. p. 30.

²Hi W. Staten, op. cit.

cattle over the plowed field to break down clods and firm the seedbed. Sometimes the operation is carried out before seeding; in other instances it is carried out afterwards. The writer has never observed this practice being followed.

Lovegrass appears to sustain little damage from rusts or other diseases associated with wet cold weather during the rainy season.¹ Midway through the growing season, weeds frequently attain a height greater than the lovegrass plants. To reduce competition from weeds and to reduce the amount of weed seed in the threshed grain, a condition which materially lowers the quality of the flour, farmers customarily rogue the weeds from their lovegrass fields. Frequently, farmers work in groups to perform this long and tedious operation.

The height attained by plants grown from native seed is seldom more than 35 centimeters (13.8 inches). The height at which the panicle is held off the ground is frequently no more than a few inches after the weak straw has settled during the ripening process. The relatively short height of the straw, coupled with the uneven surface, resulting from soil cracking renders the mechanical harvesting of lovegrass very difficult. To a greater or lesser extent this is true for all cereal crops presently grown in Ethiopia.

Lovegrass is usually harvested in late October or November. Like most other cereal grain in Ethiopia it is threshed

¹Ibid.

either by having oxen tramp the grain on a circular threshing floor or by flailing the grain. Following threshing by either method the grain is separated from the straw and chaff by winding. Threshing by this method results in grain that is mixed with other seed and contaminated with manure and dirt.

Barley, or gaba, is one of the two or three most widely-grown crops. It is used in making a native beverage, called talla, and, to a limited extent, for making bread. Stands of barley growing in Ethiopia are frequently a mixture of several types, including two-row, six-row, and club. A small percentage of black barley is usually contained in stands intended as white.

Barley is generally grown at a relatively high elevation. Usually, it is planted on lighter well-drained soils. Barley may be planted at any period close to or during the rainy season. Under such condition it is harvested in November or December. Barley is threshed in a manner similar to lovegrass.

Wheat, or sinde, is grown widely throughout Ethiopia. It is grown from the fringes of desert country to plateau country at altitudes up to 2440 meters (8,003 feet). Many species of wheat are grown, the most common being amber durum, and native red wheat. Considerable soft white wheat is also grown. The hard red spring type of wheat is less

common. Often, the seed planted by farmers is a mixture of several types.¹

In areas where rainfall is limited, wheat is usually seeded at the beginning of the rainy season. In areas where heavy rains extend over a period of three months and are accompanied by relatively cool temperatures, farmers plant wheat in late August or early September. Late seeding under such conditions is necessitated in order to hold rust damage to a minimum. Under irrigation, which is very limited, the planting date may be anytime that will permit harvesting in fair weather. The general harvest season for wheat is in November and December.¹

As of December 10, 1954, there were 450 flour mills registered in Ethiopia. Although most of these are small village-operated units which produce flour of relatively poor quality, a limited number, including three from a total of 95 in Addis Abeba, mill fair-quality flour most of which is exported.² Much of the flour milled for local use is poor in breadmaking qualities. Very often it is made from wheat containing a high percentage of durum. The result is a very flat and dense loaf. Hard red spring wheat is not grown in

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 24.

²Imperial Ethiopian Government, Ministry of Commerce and Industry, op. cit., p. 27.

sufficient quantity to be milled alone. For this reason and for the reason that most millers do not know how to handle hard red spring wheat, it presently sells for less than other types of wheat. Another cause for the flour being low in quality is that cleaning the wheat of mixtures and foreign material is difficult or impossible with the limited equipment used in the average mill. Other types of wheat, other grain, and weed seeds such as darnel are frequently present. Contaminants such as dirt, manure, and small pieces of stone are always present in wheat threshed on the threshing floor. In mills which have adequate cleaning equipment, as much as 15 to 20 percent foreign material is removed.¹ Much needs to be done in the way of educating farmers to use clean seed of a preferred type and variety, and to properly clean grain.

Sorghum, or dura, a crop believed to be indigenous to Ethiopia, is usually grown on light soils at an elevation of 1220 to 1980 meters (4002 to 6494 feet) where a low to moderate rainfall is found. It is grown under irrigation at lower elevations. Sorghum is grown extensively in Harer Province and on the Sudan Plains in the northwestern part of Ethiopia, and on foothills throughout the country. The widespread growing of sorghum is attributed mainly to the fact that the crop is less subject to locust damage than are most other

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 24.

cereal crops.

Both grain and forage sorghum are grown. The former, tall-growing milo, is most common. On fertile soil, grain sorghum frequently attains a height of 3 meters (9.8 feet). Tall-growing sorghum is desired by Ethiopians because the stalks are used for fuel, for feed, and, in certain sections of the country, for lining the walls of houses.

Because sorghum will tolerate a fairly dry climate, it is frequently grown as the only grain crop. Where such is the case the seed is usually scattered on stubble land before tilling of the soil is begun. Then, as the land is plowed to the usual depth of from 7 to 11 centimeters (2.8 to 4.3 inches) the seed is covered, all in one operation. After the sorghum has grown to a height of 20 to 40 centimeters (7.9 to 15.7 inches) it is plowed into a semblance of rows which, in rare instances, are formed on the contour. Throughout the growing season sorghum may be plowed several times. For this operation, the same tool is used that is used to prepare the seedbed. Severe root pruning often results. Dislocated plants are transplanted into the row. Many factors thus contribute to relatively low yields.

Birds are numerous in Ethiopia and bird damage to crops, particularly to sorghum, is serious. The usual approach to a control is to station a young boy or girl on a raised platform in the field; two or more watchmen are used in large

fields. When birds or other predators enter the field the watchman snaps a whip or hurls a rock from his sling shot. The control is described by farmers as being very effective.

Corn, or ihil, is an important crop in some parts of Ethiopia, particularly in the southwest where the rainfall is adequate at an altitude of 1525 to 1980 meters (5,002 to 6,494 feet). In this section of the country dent corn is grown. In other sections flint corn predominates.¹

Corn is used in the preparation of fermented beverages. In the dough stage it is eaten much as the "roasting ear" is eaten in the United States. Mature corn is sometimes parched over an open fire and eaten from the ear. A large proportion of the crop is used in the making of flour from which the native bread, injera, is frequently made. Stalks are used for fuel and feed.

The planting date for corn is dependent upon the rainfall pattern. However, the usual practice is to plant prior to the heavy rains which fall during the period July through September, and harvest after the rains. Tasseling should occur before or after the heavy rains.

Corn grown by natives in Ethiopia resembles, in variety of color, the corn grown by American Indians. The seed is broadcast and is covered by stirring the soil with an ox-

¹Ibid., p. 80.

drawn plow. When plants have attained a height of 20 to 40 centimeters (7.9 to 15.7 inches), rows are plowed through the field. Dislodged plants are transplanted into the row. This operation disturbs the root system of many plants and is a factor contributing to low yields.

Stimulant crops

Although cereal crops constitute a necessary food source for Ethiopians, the country's balanced economy is due primarily to revenue earned from the export of coffee and chat. The latter (Celastrus edulis) is an important stimulant crop throughout North Africa and the Middle East.

Coffee is the most important cash crop grown in Ethiopia. The return derived from the export of coffee annually surpasses that of any other agricultural product. In 1954 coffee exports were valued at Ethiopian \$112,370,922 (United States \$44,948,369) which represented 63.4 percent of the total value of exports.¹ A substantial portion of the revenue derived from the export of coffee is absorbed through taxation by the Government. However, many individuals and workers, including farmers, traders, and transportation workers share in the profits.

Coffee of the type (Coffea arabica) is believed to be

¹Imperial Ethiopian Government, Ministry of Commerce and Industry, op. cit., pp. 35-37.

indigenous to Ethiopia and is grown in two principal areas. One is an area known as the Chercher Highlands extending from Arusi Province to the Harer Plateau. The most important coffee-producing area is in the southern and southwestern parts of Ethiopia including the provinces of Kefa, Sidamo, Ilubabor, and Gemu Gwofa.¹ The latter is the larger of the areas and, because of its climate, soil, and altitude, is ideally suited to the production of coffee.

There is considerable variation in the manner in which coffee is grown. Basically, the difference hinges around whether the plants are growing wild or are under cultivation. Much of the coffee produced in the southern part of Ethiopia is harvested from coffee forests, areas in which, for the most part, the present crop of trees was not planted. Here, no systematic care is given the trees. The coffee cherries are harvested from the forest, processed, and marketed. Yields from forest land are variable. If properly handled, forest-grown coffee is of good quality.

Cultivation of coffee may be on a plantation scale or on an individual operator basis. Sizable plantations are found in the provinces of Kefa, Sidamo, and Gwojam. Here the operation is on a commercial basis. Trees are set out on

¹Pierre G. Sylvain. Coffee. Report submitted to the Ministry of Agriculture. Addis Abeba, Ethiopia. (Unpublished typewritten rept.) (ca. 1954). pp. 1-2.

cultivated land. Special techniques of planting the seeds or seedlings, shading, mulching, and pruning are stressed, generally increasing production and improving quality. Extensive research underway at the Jima Branch Experiment Station is concerned with the problem of commercial production.

Much of the coffee which is marketed in Ethiopia is poor in quality. This is not due to an inherent weakness in the highland coffee, which is in demand for mixing with South American coffees, but is more the result of improper harvesting and drying, improper processing, and improper handling.

There is much that could be done through extension education toward improving the quality of coffee. A few of the malpractices being followed are listed below.

1. Young seedlings needed for transplanting are frequently pulled from the soil. This practice results in loss of much of the root system and serious disturbance to the remainder. Experiments have shown that transplanting in this manner results in the death of 50 to 90 percent of the seedlings.¹

2. In picking the coffee cherries two malpractices are common. Pickers, who are usually paid on a gross weight basis, frequently pick cherries which have fallen on the ground. The picking of unripened cherries also is damaging

¹Ibid., p. 3.

to the quality of coffee processed by the "wet" method which is coming into use.

3. Flavor is basic to quality. In drying the coffee a common practice followed by Ethiopian farmers is to place the freshly-picked cherries and the partially-processed beans on the ground or on animal skins. Either surface imparts an unnatural and undesirable flavor to the coffee.

4. Quality is also lowered through improper processing, storing, and transporting.

The improvement of these and other practices should bring about improvement in the quality of coffee within a relatively short time. Much-needed research will, in the future, bring about additional improvement.

Chat (Celastrus edulis) is a stimulant crop grown commercially in the area of Harer. It is grown in other parts of the country for local consumption. Leaves of the chat shrub are consumed in a number of ways. They may be eaten directly, rolled and stuffed into the nostril, or steeped in water to form a drink similar to tea. Regardless of the manner in which the plant is consumed, the leaves must be used while fresh. Therefore, growers usually market the leaves daily. While in transport to market the leaves are protected by a wrapping of green foliage secured from other plants. Because of the necessity for marketing fresh produce, chat is regularly transported as air cargo to consumer

markets outside of Ethiopia. The exports of chat rank in value second only to the value of coffee exports.

Tobacco is grown to some extent at lower elevations where night temperatures are favorable and where rainfall is regular and dependable or where irrigation is possible. A government tobacco factory began processing tobacco, primarily for home consumption, in November, 1951. In the interest of improving quality and increasing production the company has distributed improved seed amongst farmers and has given them instructional assistance. Instruction has been concerned with improved methods of planting, cultivating, and irrigation. It also covers proper picking and handling of leaves. Other stimulant crops include tea and gesho, the latter being similar to the European hop.

Oil crops

There are four oil crops which make up most of Ethiopia's lucrative oil and oil seed export. These are nug, flax, castor beans, and peanuts. Nug (Guizota abyssinica) is the principal cooking oil used in Ethiopia and, in addition, large quantities are exported. Nug is a nonleguminous annual which bears long black seeds in a compact seed head. It threshes easily and has a very high oil content. Nug is grown at altitudes of 1980 to 2300 meters (6,494 to 7,544 feet) in western Ethiopia, in Harer Province, and on the

northern part of the Central Plateau.¹ Unfortunately, exporters have been burdened with a high tax on nug. The tax, when passed on to the farmer, has discouraged many from raising the crop.²

Flax is grown primarily for oil. Because of the relatively low fertility of Ethiopian soils with respect to certain elements, yields are low. The crop is generally grown only on the best soil at high elevations. Largely because it is not used as a food, linseed oil constitutes a greater proportion of oil exports. It is probably less important to the country than nug.

Castor beans (Ricinus communis) constitute one of the many crops believed to be indigenous to Ethiopia. This crop has been reported growing wild in many parts of Ethiopia.³ As only limited home use is made of castor beans or castor oil, the crop is grown chiefly for export. The present price of castor beans in Ethiopia is not conducive to their being grown extensively.

Under cultivation the beans are given wide spacing both between and within rows. Most native types are perennial and

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 28.

²D. B. Jeffrey. Agricultural extension in Ethiopia. Addis Abeba, Ethiopia. (Personal interview). March, 1954.

³Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 29.

produce well initially but taper off sharply in production after the first year. The plants sometimes attain a height of 4.5 meters (14.8 feet), a characteristic which tends to make them susceptible to the long dry season, particularly at elevations below 1525 meters (5,002 feet). Ethiopians have no machinery which will remove the hull. Performing the task by hand is slow and costly; many beans are damaged in the operation.¹

Peanuts are grown to a limited extent primarily near the cities of Harer and Nazret. They are frequently planted among rows of growing sorghum; however, being so handled they yield poorly. Peanuts, or groundnuts, as they are usually called in Ethiopia, serve a multiple purpose in that they provide food, oil, and feed and, being leguminous, they tend to be less of a drain on soil fertility than most other crops. They should be grown more extensively than is now true. Other oil crops include mustard, sunflower, and cotton. The latter is not grown widely for oil.

Legumes

A number of leguminous crops are grown in Ethiopia. They are grown primarily for food. The more important legumes, most of which are annuals, include field peas (Pisum

¹Ibid.

sativum), chick peas (Cicer arietinum), lentils (Lens esculenta), mung beans (Phaseolus aureus), horse beans (Faba vulgaris), and field beans (Phaseolus vulgaris).¹

Field peas are grown at high elevations, usually as a source of food and feed. As is true of other legumes, field peas are seldom, if ever, planted for the specific purpose of building soil, although this may be an incidental reason for their being planted. When field peas or other legumes are grown, minimum amounts of organic matter and nitrogen are returned to the soil because the entire above-ground plant is removed from the soil for use as food or feed. Only the roots are returned to the soil. Field peas usually produce well under conditions of cool highland climate even on badly eroded soil. A sizable part of the field-pea crop is eaten by rural people.

Chick peas and lentils are grown primarily for food; the latter is an important component of a highly seasoned food called wat eaten daily by Ethiopians. Chick peas are used green. These, like most legumes, are somewhat slow growing due to the cool climate of the elevated plateau. Mung beans are less widely grown than are peas and lentils. Because mung beans can be dried and stored, they provide an excellent rainy-season food source for rural people. In other parts of

¹Ibid., pp. 32, 33, 35.

the world they have been used very successfully as a poultry feed. Horse beans and field beans, or haricot beans, are important legumes grown for food and for export. At altitudes of 1525 meters (5,002 feet), where there is a much higher rate of evaporation than on the Plateau, beans generally produce better than peas. Beans, particularly field beans, are subject to heavy loss due to disease.

Very little alfalfa is grown in Ethiopia other than on a trial basis. Various types of clover have been observed but little use has been made of them.

Fiber crops

The principal fiber crops in Ethiopia include cotton, false banana (Musa ensetta), flax, and sisal (Agave sisalana). The first two mentioned are most important and will be discussed.¹

Cotton, or tit, is grown on a limited scale in very widely scattered sections of Ethiopia. It is cultivated at a lower altitude than most other crops. Cotton is grown in all provinces and in Eritra. The areas where most cotton is produced are from the vicinity of Lake Tana eastward into Welo Province, on the Sudan Plains in northwestern Ethiopia, in southwestern Ethiopia, and at scattered points within the Rift Valley.

¹Ibid., pp. 35, 67.

Most of the native cotton grown in Ethiopia is of the perennial type. It is left standing indefinitely. The yield of cotton is very low. Among other things, this is due to poor cultural practices, to the use of a perennial-type cotton, and to disease and insect damage, the worst of which is sustained from locusts. The yield of cotton in a large percentage of fields is so low as to be nearly nil.

Ethiopia could profit greatly from an increase in cotton production. Raw cotton and cotton textiles constitute a major part of imports during recent years as can be seen from Table 4.

The Italian Occupation Government undertook a program to expand cotton production in several more favorable areas in Ethiopia. The largest project undertaken was that in the Kobo-Alamata area which covers more than 140,000 hectares (345,800 acres) in the southern part of Tigre and in the northern part of Welo Province.¹ A cotton cleaning and ginning plant was begun in the town of Alamata. American-made cleaning and ginning machinery was installed in this partially-completed plant which is reported to have operated for no more than two years.

Another production center was begun by the Occupation

¹Luther H. Brannon. Cotton production at the Alamata Improvement Center. Report presented at staff meeting of the United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Oral). July, 1955.

Table 4. Cotton imports^a (In 000's dollars)

Description of cotton product	1949			1951			1953		
	Value		Per- cent of total imports	Value		Per- cent of total imports	Value		Per- cent of total imports
	Ethi- opian dol- lars	United States dol- lars		Ethi- opian dol- lars	United States dol- lars		Ethi- opian dol- lars	United States dol- lars	
Raw cotton	1,000	400	1.1	2,500	1,000	2.4	3,700	1,480	2.7
Cotton textiles	43,300	17,320	46.9	41,900	16,760	40.1	40,200	16,080	29.2
Total	44,300	17,720	48.0	44,400	17,760	42.5	43,900	17,560	31.9

^aInternational Bank for Reconstruction and Development. Current economic position and prospects of Ethiopia (Publisher not given). Washington, D. C. 1954. p. 14.

Government in the area lying east of Lake Margurite, in Arusi Province. Here again the conditions appear to have been favorable for large-scale production of cotton. The Occupation Government established and equipped a cleaning and ginning plant at this location. A third center appears to have been planned for the area around Gwonder in Begemdir Province. Machinery is reported to have been purchased for this location.¹

Only one large-scale cotton-growing center is in operation at the present time. This is at Teseney in western Eritra. Here, under direction of a privately-owned Italian firm, cotton is grown, cleaned, ginned, and baled for export. Ethiopian farmers grow the cotton on a share basis. The firm supplies seed of an improved variety and water for irrigation. Farmers furnish their land and labor. From an educational standpoint it is important that the firm provides the services of fieldmen whose job is to help farmers in producing more cotton of better quality. Officials of the center have reported that the Ethiopian farmers are pleased with the arrangement and that yields and quality have definitely improved since the services of the technically-trained fieldmen were made available.

¹K. D. Bickers. Birmingham, Alabama. Information concerning equipment purchased from Continental Gin Company by Compagnia per il Cotone di Ethiopia, Milan, Italy. (Private communication). March, 1957.

False banana (Musa ensetta) is one of the most important fiber crops grown in Ethiopia. It is grown extensively in southwestern and southern Ethiopia. Sidamo Province is particularly noted for production of this crop which is used for the making of inexpensive but fair quality rope, cordage, and bags.

The plant appears similar to the real banana tree except that it, the false banana tree, is smaller. Like many other crops in Ethiopia it is found both under cultivation and in the wild state. Strong woody fibers found in the center stem of the large leaves are removed by one of two methods both of which are rather detailed and difficult. A major part of present production is utilized in a fiber factory now operating in Addis Abeba.

Flax is grown principally at higher elevations both as an oil and as a fiber crop. Although grown in considerable amount, flax as a fiber crop cannot compete with cotton on the Ethiopian market because of the difference in costs. Quality bears little consideration among the relatively poor Ethiopians. There is doubt whether Ethiopian fiber flax is of sufficient quality to compete on the world market. Because of these considerations, flax will probably remain primarily an oil crop.

Other fiber crops include sisal (Agave sisalana), a fiber crop which shows promise for areas where the soil is

light and where rainfall is low. This crop is grown in parts of Eritra where little else will survive. It is used to make an inexpensive rope of fair quality.

Other crops including fruits and vegetables

There are many other crops which are important in Ethiopian agriculture as a food, as export commodities, or both. These include fruits and vegetables, potatoes, and sugar cane. Growing conditions in Ethiopia are such that a wide range of fruits can be grown. Among fruits grown, there are: tangerines, oranges, limes, lemons, grapefruit, citrons, bananas, papaya, apples, peaches, plums, grapes, strawberries, pineapple, dates, figs, and avocados.¹

Fruits are generally grown at elevations where the temperature is warm and rainfall plentiful or where irrigation water is available. Grapes are grown with some success at altitudes up to 2440 meters (8,003 feet). Unfortunately, transportation facilities are not sufficiently developed to permit the shipment of perishable fruit more than a short distance; therefore, fruit is generally grown close to the better roads leading to the large cities and towns. Under these conditions fresh fruits and vegetables can be marketed within a day or two after picking. Perishables, such as

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 69-75.

tomatoes and bananas, are packed in straw-filled baskets and when so handled can be transported considerable distances.

The quality of certain fruits such as tangerines, bananas, and papaya is excellent. That of citrus fruits, particularly oranges and grapefruit, is often low due to the very sour taste of the fruit.

Vegetable production has grown to be of considerable importance, particularly near large cities. This is evident by the sizable quantities of fresh vegetables which can be seen daily being taken in baskets to the city markets. In sections of the country where water is available, continuous production of root crops can be maintained. Staggered plantings, throughout a continuous growing season could provide the vegetable farmer with a fairly steady income. Vegetable gardening should be encouraged for reasons already mentioned and for reason of providing a more balanced diet for Ethiopians.

Quality varies widely among the different vegetables. Vegetables of the cabbage group are generally of good quality. With the exception of sweet potatoes most root crops are of fair quality. Greens and beans tend to be tough and fibrous. Sweet potatoes are fibrous and are of extremely poor quality. The typical sweet potato looks like a root of nearly uniform cross section. Sweet potatoes introduced from the United States have produced exceedingly well.

Potatoes are grown in many sections of the country. They are used by Ethiopians in preparing a food called wat. Most tubers are low in quality, often displaying a soft gelatinous texture when cooked. Sometimes the flesh is discolored. The tubers are nearly always damaged in handling. Much of the highland area appears well suited to the growing of potatoes. Ethiopians frequently transplant potato plants with apparently slight ill effect.

Sugar cane is grown for local consumption in certain sections of the country where irrigation is practiced. It is grown commercially by a Dutch concern operating a large sugar cane plantation near Nazret in Shewa Province. This concern, Handels Vereniging of Amsterdam, has a 99-year lease on a large area of land and is growing and processing cane on the estate. This organization does not buy cane from farmers. All cane which is refined is produced by the Company. Ethiopians are employed only as hired workers.

Grassland and Pasture

Livestock raising is the principal occupation in Ethiopia.¹ It is participated in by nearly every rural family

¹Technical Cooperation Service to Ethiopia. Monthly report of the Service. August 6, 1952. Addis Abeba, Ethiopia. (Mimeo.) p. 1.

and a considerable number of urban families. The almost-universal participation in livestock raising has resulted in the massing of a dense livestock population. This, in turn, has created great pressure on the country's available grassland and pasture and has lent impetus to that phase of Ethiopian agriculture.

As neither a cadastral survey nor a census has ever been carried out in Ethiopia, it is necessary to use an estimate of the land in grass and pasture. For this purpose, an estimate made by officials of the United States technical assistance mission to Ethiopia has been used and is presented in Table 5. As may be observed from this table, there are in Ethiopia, excluding Eritra, an estimated 45,300,000 hectares (111,891,000 acres) of grassland and pasture to which could be added an estimated 6,300,000 hectares (15,561,000 acres) of unused but potentially productive land to give a total of approximately 51,600,000 hectares (127,452,000 acres) of grazing land in Ethiopia.

On the basis of information released by the Food and Agriculture Organization, there were in Ethiopia in 1951 about 55,500,000 head of livestock.¹ A breakdown of this number by types of livestock together with the equivalent number of cow units is shown in Table 6.

¹United Nations Food and Agriculture Organization. Land use statistics. Rome, Italy. 1951.

Table 5. Land use in Ethiopia (Estimated 000's of units)

Land use	Eritra ^a			Pre-federation Ethiopia ^b			Ethiopia (total)		
	Hec- tares ^c	Acres	Per- cent	Hec- tares ^c	Acres	Per- cent	Hec- tares ^c	Acres	Per- cent
Cultivated land	400	988	3.0	9,000	22,230	10.0	9,400	23,218	9.1
Unused but potentially productive	200	494	1.5	6,300	15,561	7.0	6,500	16,055	6.3
Grassland and pasture	2,200	5,434	17.5	45,300	111,891	50.0	47,500	117,325	46.1
Wasteland	9,800	24,206	78.0	27,200	67,184	30.0	37,000	91,390	35.8
Forest	d	d	-	2,700	6,669	3.0	2,700	6,669	2.7
Total	12,600	31,122		90,500	223,535		103,100	254,657	

^aAdapted from Harvey M. Coverly. Asmera, Eritra. Agriculture in Eritra. (Personal interview). June, 1954.

^bAdapted from Technical Cooperation Service to Ethiopia. Fact sheets on Ethiopia. Data compiled by staff of Service. (Mimeo.) May, 1954.

^cEstimate, rounded to nearest 100,000 hectares.

^dEritra has very little forest.

Table 6. Number of livestock in Ethiopia^a

Type of livestock	Number	Number of head per cow unit	Equivalent number of cow units
Cows and oxen	13,000,000	1	13,000,000
Calves	6,000,000	2	3,000,000
Horses	1,000,000	1	1,000,000
Mules	1,000,000	1	1,000,000
Camels	500,000	1	500,000
Asses	3,000,000	3	1,000,000
Sheep	18,000,000	5	3,600,000
Goats	13,000,000	5	2,600,000
Total	55,500,000		25,700,000

^aUnited Nations Food and Agriculture Organization. Land use statistics. Rome, Italy. 1951.

If the assumption is made that the livestock population has remained fairly stable during the period from 1951 through 1956, then there are available slightly more than 2 hectares (4.9 acres) of grazing land for each cow unit. The area is increased to more than 3 hectares (7.4 acres) of grazing land per cow unit with the inclusion of wasteland which, in practice, does support limited grazing for nomadic herds.

However, the true situation is not represented by these

figures. In the lowlands where there is often less than 250 millimeters (9.8 inches) of rainfall, the nomadic tribes live by their herds. In these sections of the arid and the semi-arid plains few crops are produced. With no crop residues left for feed, livestock must gain their entire support from the over-grazed pastureland. Another aspect of the same problem is that water holes are often widely dispersed, and this necessitates the moving of herds back and forth between water and grazing land. As a result, pastureland in the vicinity of water holes is over-grazed to the point that little or no vegetation remains. At the same time pasture situated far from water may be grazed very little. In some areas of Ethiopia there are many wild animals which also feed on the available pasture.

On the Central Plateau overgrazing is less prevalent than in the lowlands. In areas such as the Central Plateau where there is sufficient rainfall, crops are grown for food; and a part of the crop residue is available for feed. A small proportion of the inhabitants in this section of the country are dependent for livelihood solely upon livestock. Furthermore, pastureland receiving from about 760 to 1520 millimeters (29.9 to 59.8 inches) of rainfall is able to withstand continuous grazing far better than the lowland pastures which receive less than one-third as much rainfall under conditions conducive to a high rate of evaporation.

For example, the grazing lands of Arusi Province and those of the Chercher Highlands extending eastward into Harer Province support dense cattle populations without appreciable overgrazing. Certain areas in the southwestern part of Ethiopia could be considered undergrazed.¹

The natural grasslands of Ethiopia are defined by the vegetative regions outlined on the map in Appendix C. As has been pointed out in an earlier section of the present study, the climate of Ethiopia is not solely tropical even though the country lies close to the equator and entirely within the torrid zone. In certain instances the effect upon the climate of nearness to the equator is offset to the extreme by the 3050-meter (10,004-foot) altitude of the high reaches of the Central Plateau. Therefore, there are found in Ethiopia instances where a climate is contained within a climate. Thus is established the irregular outline of the grasslands which may be grouped under four principal headings:

1. Desert consisting of short bunch grass and bushes.
2. Steppe consisting of tall bunch grass and scrub trees.
3. Savanna consisting of tall grass and some trees.

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 56.

4. Tropical highland consisting principally of cleared farmlands, forests, and tall trees.

A considerable portion of Ethiopia is classed as desert. Because of low rainfall and extreme heat, there is scant vegetation in this region which supports only limited numbers of livestock, primarily camels and goats. Following brief periods of rain, animals find adequate feed, but within a few weeks they are seen browsing on bushes or gathering parched plant remnants from the sun-baked surface of the desert. After a brief period the obtainment of sufficient pasture is contingent upon the migratory grazing of herds. Within the desert are certain limited areas of marsh land which supply valuable grazing during the dry season.

Forming an irregular ring around the Central Plateau, almost as a huge contour spacing, is the steppe land made up primarily of tall bunch grass and scrub trees. This is the largest and one of the most important grazing regions. Large numbers of livestock are produced on this type of grazing land. In this connection, Staten¹ has made the following statement:

The largest and most thrifty cattle come from the short-grass country of the semi-desert region and the smallest bone and resulting small type animals come from the luxuriant vegetation region.

¹Ibid., p. 66.

Vegetation in the steppe region consists largely of perennial grasses with a scattering of dry thorn bush. Near the outer fringes of this region conditions are more droughty and resemble those of the neighboring desert. Here, during and following periods of rain, annual grasses stage a rapid but short growth. Throughout the latter part of the long dry period animals feed largely upon low-growing shrubs and weeds.¹ In the proximity of the highlands there is a substantially better growth of grasses and correspondingly improved grazing.

There is some overlapping between steppe and savanna regions. The latter is a relatively small, but important, grazing region characterized by higher elevation and heavier rainfall than the steppe region. In this region there is a concentration of livestock which is leading to overgrazing in some areas. However, much of grazing land in this region of limited size appears to be supporting the dense livestock population without apparent deterioration of the grass cover. This is particularly true in the Arusi Highlands and in portions of the Chercher Highlands. Cattle marketed from this area of the country probably are second in quality only to those raised in the short-grass region.

¹William J. Beck. Livestock in southeastern Ethiopia. Report presented at staff meeting of United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Oral). January, 1954.

The highlands of the Central Plateau are taken up largely as crop land, pastureland, and an undetermined amount of forest. The climate and grasses of this region do not afford the best grazing in Ethiopia. The highland grasses are sometimes tough and wiry.¹ A season of prolonged heavy rain renders all highland grasses very succulent and therefore somewhat undesirable for grazing during the rainy season.

In summary, it may be stated that overgrazing brought about by excessively large herds of livestock is a major problem in Ethiopian agriculture. This problem is most serious where, because of limited moisture, people must rely solely upon livestock raising as a means of livelihood. The best cattle come from the steppe and savanna regions which are relatively small in comparison to the total grazing area.

Livestock

Livestock resources constitute one of Ethiopia's greatest capital assets. In 1952, the value of all livestock in Ethiopia was estimated to be more than Ethiopian \$2.7 million

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., pp. 64-65.

(United States \$1.08 million).¹ Livestock husbandry is probably participated in by people in every community in the country. It is common even in those areas which are too dry for the production of crops. Consideration will be given to the principal classes of domesticated livestock; namely, cattle, sheep, goats, donkeys, horses and mules, poultry, camels, and swine.

Cattle

Ethiopian cattle (Bos indicus) are an important source of meat and leather and they are the principal source of milk for people in this agricultural country. Oxen are used as draft animals almost exclusively. Cattle hides constitute one of the leading exports of Ethiopia. Ethiopian cattle, or zebu cattle, as they are commonly called, have been used elsewhere in the world as breeding stock to obtain resistance to tick fever and heat.

Zebu cattle have a characteristic hump over the withers. They are characteristically deep through the withers and dewlap but are shallow through the hind quarters. The true zebu type has short spreading horns. However, in Ethiopia, horns are commonly much larger. This atypical feature of Ethiopian cattle may indicate that something in addition to zebu stock is represented. Despite their possessing long

¹Technical Cooperation Service to Ethiopia, op. cit., p. 1.

and dangerous appearing horns the cattle of Ethiopia are docile.

Among Ethiopian cattle a reddish-brown color predominates, but black, white, fawn, and other colors are seen singly and in various combinations. Cattle throughout Ethiopia vary greatly in size, a condition which may be due, in part, to environment. An average mature ox could be expected to weigh about 450 kilograms (990 pounds), a mature cow about 350 kilograms (770 pounds).¹

The estimated cattle population in Ethiopia as shown in Table 6, on page 112 is 19,000,000. This figure does not include the cattle in Eritra. Beck has established, on the basis of cattle hides exported from Pre-federation Ethiopia and from Eritra for the period 1949 through 1952, that the cattle population of Eritra was approximately 9 percent that of Pre-federation Ethiopia.² Expanding the figure 19,000,000 by 9 percent gives an estimated cattle population of 20,710,000 in the Empire. This calculation is made on the assumption that the cattle population has remained fairly constant since 1951.

A survey made in 1944 by a United States survey team indicated that for every hundred cattle in Ethiopia there

¹Ibid., p. 157.

²Ibid., p. 159.

were 35 oxen, 3 bulls, 29 cows, 16 calves between 1 to 2 years of age and 17 calves under one year. Applying these figures to the above estimate of the total population indicates that the cattle population is made up of the following numbers:

Oxen	7,250,000
Bulls	620,000
Cows	6,000,000
Calves 1 to 2 years	3,320,000
Calves under 1 year	3,520,000

Assuming the cattle population to be fairly stable, the figure of 3,520,000 calves under 1 year should closely approximate the number of animals which are annually disposed of through slaughter, export, disease or other means. It is around this figure that the future of cattle raising in Ethiopia hinges.

A thorough program of disease eradication will surely tend to increase the number of cattle and thereby increase the pressure on grazing land unless more cattle can be marketed and farmers can be persuaded to use better range management practices. Contingent upon the establishment of a system of grading, the farmers must be shown the value of producing and selling quality animals. The latter is very important because the better animals are frequently kept while the sick and old are sold. The maintenance of large numbers of livestock is attributable to a lack of developed markets; to insufficient demand for meat, milk, and other

products; to the fear on the part of livestock owners that losses due to disease will reduce numbers below that needed for the essentials of a livelihood; and to the fact that social status is associated with the ownership of large herds.¹

There are three principal channels through which slaughter beef reaches consumers. A portion of the total is slaughtered and retained for home use; another portion is slaughtered and sold through city markets. The remainder is exported live or as canned or frozen meat. The export of both live and frozen meat is on the increase. Although a certain amount of beef is included in the everyday diet of Ethiopians, it is eaten primarily on festive occasions, which are numerous. On such an occasion an animal is slaughtered, and the meat is immediately distributed through sale to various persons or is consumed, usually uncooked, on the site by a gathering of friends. There are two reasons why beef is not generally used in the daily diet of Ethiopians. First, beef is more expensive than the meat of sheep or poultry. Secondly, because of the warm climate, no meat keeps without being dried. Therefore, the smaller the animal slaughtered the less money involved and the less meat lost. In the large towns and cities meat is slaughtered

¹Technical Cooperation Service to Ethiopia, op. cit., p. 2.

and sold through vending markets. Except for that under preparation for export, there is no refrigeration of meat in Ethiopia. Up to the present time, there has been only one plant engaged in the production of frozen meat for export. It is located in Asmera, Eritra. In 1946 (Ethiopian calendar), which corresponds roughly to 1954 (Gregorian calendar), 1308.9 long tons (1,466 short tons) of meat were frozen for export in the Asmera plant.¹

In 1954 an export firm headquartered in Dire Dewa began exporting live cattle into Israel.² Cattle are purchased from farmers or merchants and are driven to the collecting station in Dire Dewa which is on the railroad. Here the cattle are vaccinated and held in isolation until immunity develops. Thereafter, the cattle are shipped by rail to Jibuti.

Most of the animals in Ethiopia are salt and mineral hungry. Livestock, particularly cattle, can frequently be seen gnawing on bones, limestone rock, and alkali deposits. Farmers are not altogether unaware of the craving shown by the animals and, where possible, may drive their herds once a month to a salt lake where the animals are allowed to feed

¹Imperial Ethiopian Government, Ministry of Commerce and Industry, op. cit., pp. 8, 10.

²William J. Beck. Addis Abeba, Ethiopia. Information concerning recent activities in extension in Ethiopia. (Private communication). April, 1957.

on salt accumulations.¹

Salt is now being processed in Ethiopia and may become available at a price farmers can afford to pay. At present, however, the high cost of manufacturing salt plus the cost of transporting the weighty substance long distances prevents its being used for stock feeding. The same is true of feed supplements such as packing plant by-products, linseed cake, and nug cake, a product derived from the oil plant, Guizota abyssinica. These feeds, though made locally, are at present priced beyond the means of the average farmer. Better management practices, however, may make the use of such feeds profitable in the future.

Providing water for herds is a major problem in the production of livestock. First, there must be a supply such as a stream, spring, lake, or well. Then this supply must be made available or distributed among the many large herds. Only a limited number of animals can be watered in one day at any given well even if the supply is adequate. Because of this and because of an inadequate supply, cattle in some arid regions are watered only on alternate days. This, of course, retards growth and reduces milk production.

There has been no cattle breeding program carried on in Ethiopia. It would appear that very little, if any, selection

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 162.

of breeding stock is done. There may even be selection away from males of desired type because the large male animals are needed for draft purposes and are so chosen and castrated at an early age, leaving the smaller bulls to run with herds. However, farmers seem to attach more importance to the inheritance transmitted by the female than by the male. They prefer a calf from a "good" cow to one from a "poor" cow.¹

The percentage calf crop is believed to be small, probably little above 50 percent.¹ The poor calf crop is probably due to a number of factors including low fecundity, poor nutrition, and disease. Calves mature slowly, reaching maturity at 3 or 4 years of age. As a result cows are late by 1 year in calving. Here again, it is likely that both genetics and nutrition are involved.

Of the many cattle diseases found in Ethiopia, the worst at present is rinderpest, a contagious disease which is estimated to kill nearly a million cattle annually.² Other diseases are common. These include tuberculosis, contagious pleuropneumonia, and anthrax. Imported cattle have been hard hit by heart water disease, a tick-borne illness. Livestock parasites, both internal and external,

¹Ibid., p. 163.

²Technical Cooperation Service to Ethiopia, op. cit., p. 2.

are numerous.

The Ministry of Agriculture, aided first by the United Nations Relief and Rehabilitation Administration and at the present time by the Food and Agriculture Organization and the United States technical assistance mission has undertaken a disease control program which is intended to decrease the losses due to disease and parasites. Most of the work to date has been directed toward control of rinderpest through mass vaccination. Records kept by field teams now engaged in the work show that 2,670,000 cattle had been vaccinated as of July 1, 1954. Most of the field work is being done by Ethiopians.¹ It is anticipated that if the rate of vaccination can be increased to 1,000,000 per year rinderpest could be brought under control within 15 years.

Despite the fact that cattle outnumber people in Ethiopia, dairy products are imported. In 1954, the value of dairy product imports approached Ethiopian \$500,000 (United States \$200,000). The zebu cattle of Ethiopia are poor milk producers. The average production probably does not exceed 2 liters (2.1 quarts) per day. Most of the milk is consumed by the families of farmers who own cattle or by nearby villagers. Most of the milk not used by the producer is

¹Clifton N. Murphy. Animal disease control program. Report presented at staff meeting of United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Oral). August, 1954.

sold as whole milk. A limited amount is utilized in the making of cheese and butter for sale in large cities.

About 7,250,000 oxen supply the traction force for most of the farming that is done on an estimated 9.4 million hectares (23.2 million acres) of cultivated land in Ethiopia, as shown in Table 5. This means that, as an average, one yoke of oxen is used to cultivate about 2.5 hectares (6.2 acres) of land. The amount of work turned out by each yoke is not truly represented by this figure, because in plowing and in tilling the soil the nature of the implement requires that it be drawn several times over the same soil. Oxen are maintained almost solely for the purpose of tilling the soil. They are rarely harnessed to a cart and are, therefore, not used for the transporting of produce to market. It is reasonable to assume that the Ethiopian farmer would stand to benefit greatly from a source of traction power that could be used for drawing the plow and also for transporting produce to market.

Sheep

There are about 18,000,000 sheep in Ethiopia. Small flocks of these hardy animals are seen grazing amongst other livestock in all parts of the country except the extremely hot desert. They appear in a wide range of solid and mottled colors. Peculiarly, some of the Ethiopian sheep

have broad, flat, fat-filled tails. Ethiopian sheep do not produce wool. Instead, the skin is covered with coarse hair.

Sheep are raised primarily for meat. The average sheep carcass is of such size that it can be consumed by one family before the meat begins to spoil. Perhaps for this reason, above any other, the daily diet of Ethiopians contains more mutton than beef. Due to a characteristically narrow frame and poorly developed leg, the average native sheep is an inefficient producer of meat.

The skins taken from native sheep constitute a substantial source of income for Ethiopian farmers. Many are used at home as well. Skins are often of poor quality, despite the ease with which an animal can be handled during the skinning process and the relatively simple task of drying a sheepskin. An ordinary sheepskin is worth about Ethiopian \$.80 (United States \$.32). Butcher skins, which receive better handling, are worth more than double that amount.¹

Native sheep are hair sheep and, therefore, produce no wool. Ethiopia imports nearly all of the woolen products used in the country. In 1954, more than Ethiopian \$5 million (United States \$2 million) worth of woolen goods were imported.² In addition to this substantial home market, wool is a

¹Imperial Ethiopian Government, Ministry of Commerce and Industry, op. cit., p. 30.

²Ibid., p. 18.

product which can readily be exported because it does not deteriorate too rapidly under conditions of poor transportation such as are found in Ethiopia. The production of wool does not interfere with the production of meat. For these two reasons it would appear advisable to begin a wool production program in Ethiopia. Such a program should be undertaken without delay once farmers have been given suitable training in caring for wool sheep.

Considerable evidence is available that wool sheep can be introduced without first having been put through a breeding program. The Ethiopian government now has over 2,500 sheep of improved type.¹ One flock is on Entoto Mountain near Addis Abeba. Another is at Koffele, and a third is at Debre Birhan. These flocks originated with an importation of 50 Italian Merino sheep by the Italian Occupation Government in 1937. The Merino sheep were held in one flock which was eventually taken over by the Ethiopian Government. Despite some early loss from disease and parasites, the Merino sheep steadily increased in number. In 1946, 30 Rambouillet sheep imported from the United States were added to the Merino flock. As a result, the 2,500 wool sheep now held by the Ministry of Agriculture are a mixture of Merino

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., pp. 169-170.

and Rambouillet blood. Mention should be made of the fact that a total of several hundred sheep, beyond the 2,500 number, have been distributed by the Ministry of Agriculture to schools and government farms throughout Ethiopia. Under conditions of fair management these sheep are doing well. They produce a fair clip, 4 to 5 kilograms (8.8 to 11 pounds).¹

Limited breeding with native sheep has been attempted. On the basis of what has been done, it appears that wool of fair quality can be produced on second and third backcross animals.¹ However, much additional research is needed before such a program of upgrading native sheep is undertaken.

Whether wool sheep are introduced directly or through a breeding program, much consideration must be given to the control of disease. As is true of native cattle, native sheep show resistance to disease, particularly insect-borne diseases which attack imported sheep. To introduce sheep showing susceptibility to such diseases among farmers in outlying provinces would be totally unwise, unless farmers can be given training in managerial practices designed to compensate for the weaknesses of wool-producing sheep. Basic instruction will also be needed in clipping, storing, scouring, spinning, and weaving wool.

¹Ibid., pp. 170-171.

Goats

According to information presented in Table 6 there are about 13,000,000 goats in Ethiopia. These hardy animals are somewhat smaller in size than the native sheep. They display a wide variety of colors set off by a very glossy coat.

Goats are raised primarily for meat although the meat of a sheep is preferred to that of a goat. For this reason it would appear that there is little justification for goats being raised in the more favorable climates of Ethiopia where sheep do well. Like sheep, the carcass of goat is small and therefore better suited to family consumption than beef.

In some areas, particularly on the desert, goats are sometimes kept for milk. They feed on brush and weeds and require much less water than cows. Another point of interest is that goatskin exports annually exceed in value both those of cattle hides and sheepskins.

Donkeys, horses, and mules

Ethiopia has not yet arrived at the stage of progress in which animals are used to draw carts and wagons. Donkeys are used almost exclusively to transport agricultural produce from farm to small market where the produce may be transferred to motor truck, rail car, river barge or airplane. Many traders use donkeys to transport produce

directly from farm to large city markets even where there is a surfaced road. It is not uncommon for grain, chickens, and less perishable vegetables to be transported 30 kilometers (18.6 miles) by donkey along a surfaced road. Many traders make a living solely by buying agricultural products in one place and transporting them for sale at a larger market. In many instances farmers themselves own from one to six donkeys which are used to transport produce to market.

The Food and Agriculture Organization estimate, previously referred to, indicates that there are in Ethiopia about 1,000,000 horses, about 1,000,000 mules, and about 3,000,000 donkeys.

Native Ethiopian horses are too light in weight for use as draft animals. Weighing about 400 kilograms (880 pounds), they are rarely used for draft other than to draw passenger carriages in the large cities. Most of the horses in Ethiopia are used as riding horses. This is particularly common among Galla people in the South and Southwest. Although hardy and apparently able to work at high altitude, Ethiopian horses appear too small for use in fields even if they were available in sufficient numbers.

In Ethiopia a mule is a symbol of status. Provincial officials customarily travel about on a mule accompanied by a number of pages. It seems reasonable to assume that mules,

instead of horses, are used for this purpose because the gait of a mule provides a more comfortable ride. Also, a mule usually has more physical stamina for the mountainous terrain. As a result, the price of a mule is much above that of either a horse or donkey, and mules are used mainly by persons who can afford the cost.

From the standpoint of the farmer who has his own donkeys for transporting grain and must also maintain a yoke of oxen solely for tilling the soil, there would be much greater efficiency in use of feed if one pair of animals, mules for instance, could be used both for cultivating the soil and for transporting produce to market. Were it not for their small size, horses might be used for this twofold purpose.

Poultry

Chickens probably outnumber all other types of poultry combined. They are found in all except the hottest parts of the country and are believed to be indigenous to Ethiopia. As is true of most other livestock in Ethiopia, chickens are small and frequently carry many colors. Most native chickens weigh less than 1 kilogram (2.2 pounds).

Chickens are available in most markets, large or small. However, the price varies sharply from place to place depending upon supply and transportation facilities.

In small villages not served by truck transport, chickens can often be purchased for Ethiopian 25 cents (United States 10 cents) each while in the markets of larger cities the same bird may sell for Ethiopian \$2 (United States \$.80).

Except for the more well-to-do people in the cities, nearly every family has its own flock, consisting usually of no more than 10 birds. These birds produce eggs and some meat for home use and perhaps a few eggs for sale at the local market. Usually the chickens are housed with the family at night. The hatching of eggs with brood hens is universal in Ethiopia. Egg production is small, probably about 50 eggs per hen per year.¹ Those not used at home are marketed locally and eventually arrive at the markets in large cities. Due to the lack of facilities for handling eggs, the warm climate, and the irregular transportation facilities, a large percentage of the eggs are spoiled before they reach the consumer.

There is some export of poultry and eggs. In 1954, 423,000 dozen fresh eggs and 70.5 long tons (79 short tons) of processed eggs were exported. In the same year nearly 75,000 live chickens were exported. The total value of poultry exports, all of which appears to have been chicken

¹Ibid., pp. 174-175.

fowl, was nearly Ethiopian \$465,000 (United States \$186,000).¹

On the basis of observation and the limited research pertaining to poultry, there appears to be much that can be done to improve the amount and quality of meat produced and the number of eggs produced. There surely is much to be done in helping farmers to get quality eggs to market. The cost of improved hatching eggs is within the means of most farmers. There appears to be great possibility for a chick hatchery enterprise in Ethiopia.

Camels

The number of camels in Ethiopia is estimated to be 500,000 which is numerically fewer than for any other class of livestock except swine. Camels are used for transportation, for meat, and for milk by nomadic people inhabiting the desert regions of Ethiopia. In the southern part of Sidamo Province natives have reported that camels average about three times as much milk per day as do cows. They reported that some camels produce up to 20 liters (5.3 gallons) per day.²

The wealth of desert nomads is measured in livestock, particularly camels. Large herds of camels, sometimes in-

¹Imperial Ethiopian Government, Ministry of Commerce and Industry, op. cit., p. 36.

²Beck, Livestock in southeastern Ethiopia, op. cit.

cluding as many as 100 head, are not uncommon among individuals of nomadic tribes.

Swine

Pork is consumed by neither of the two major religious groups; namely, Coptic and Moslem. For this reason few hogs are raised in Ethiopia except to supply Europeans. For this market, hogs of imported breeds are raised. The quality of such pork is good but sells at from two to three times the cost of beef. Hogs appear to do well in Ethiopia. Few hog diseases have been noted.¹ However, without fences hogs destroy crops and become a nuisance. Furthermore, hogs do not herd and this is the universal method of handling grazing animals. Building fences is presently far beyond the means of most farmers.

Land Tenure

Land is the principal natural resource of Ethiopia. From the land are derived the agricultural products including coffee, oils and oil seeds, hides and skins, and pulses which make up the principal exports of the country.² Most

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., pp. 175-176.

²International Bank for Reconstruction and Development, op. cit., pp. 1, 14-18.

of the inhabitants of Ethiopia, a country with limited industry, are engaged in work directly or indirectly related to agriculture. Thus, land and land tenure are linked closely with the social, economic, and political structure of the country, and are basic to a program of improvement.

A description of land tenure in Ethiopia is made difficult by (1) the absence of a complete land survey with supporting maps and records and (2) the absence of laws governing land tenure and a corresponding prevalence of customs which vary considerably from place to place.

To date, no complete cadastral survey has been made in Ethiopia although some work is now underway in Shewa Province. Without such a survey and supporting maps and records, the proportions of land under government ownership, under church ownership, and under private ownership are not known. The proportion of land tilled by owners versus that tilled by tenants and sharecroppers is not known. The amount and location of land available for settlement is not known. All would be very useful in outlining a program for improvement. The discussion of land tenure will be divided into five parts including use rights, government lands, church land, private ownership of land, and land taxation.

Use rights

At the time of writing there are in Ethiopia few regula-

tions governing land tenure.¹ Titles are not guaranteed, and property rights are not clearly defined.² As a result, land tenure is governed largely by customs, or rights, which are rarely in written form and which are subject to almost infinite variation. In most cases, land rights have been acquired as a grant from an emperor; however, certain rights are passed on by inheritance although considerable variation is to be found in this regard. Prior to the Restoration many rights were known in Ethiopia. The number appears to be decreasing with time.

Certain of these rights can be compared to conventional forms of land tenure such as private ownership or tenancy. Two examples will serve to better describe land rights before they are discussed individually. The rist right is an example of a conventional form of land tenure; it refers simply to land held by ownership.³ However, because there is no guarantee of title in Ethiopia, rist can scarcely be

¹Nathan Marein. The Ethiopian empire. Federation and laws. J. Vurtheim and Son, Ltd. Rotterdam, Netherlands. 1955. p. 249.

²James C. Atherton. Land tenure in Ethiopia. Addis Abeba, Ethiopia. (Personal interview). January, 1956.

³As is true of most rights, the name applies to either the right or to the land. For example, the term "rist right" would be used when reference is made to the entitlement, and the term "rist land" would be used when specific reference is made to the property.

defined as absolute ownership encompassing the right to freely dispose of land, although in certain instances this privilege accompanies the rist right.

Certain rights may cut sharply across one or more conventional forms of land tenure and individually give to the holder special privileges. The guilt right is an example. It may be superimposed upon rist. The fact that a gasha¹ of land is held under ownership by a farmer does not preclude the imposition of guilt right upon that land. Guilt is believed to be much less common today than it was before the Italian Invasion.

Six of the more common rights, the identification of which will be through the Amharic name, will be discussed briefly. These include: rist, guilt, siso guilt, rist guilt, samon, and maderia.

Rist is the right of ownership, a claim which does not necessarily include the right to freely dispose of the land. The right of ownership may be vested in one individual or in a group of individuals. In an instance where the land is owned collectively by the inhabitants of a village or community it is distributed among the inhabitants who farm allot-

¹A gasha is now generally considered to be equal to 40 hectares, or approximately 100 acres. Originally, however, a gasha was, within limits, that amount of any given type of land equal in productivity to 40 hectares of relatively fertile land. In certain sections of the country this definition is still held to.

ted portions. Collective ownership will be discussed more fully hereinafter. Land owned by a single individual may be cultivated by the individual himself; but if the tract is sizable, it is usually let out in small parcels to farmers who till the soil as sharecroppers, tenants, or as hired farmers. In the latter case, the farmers are paid a salary, either in money or in produce.¹ If a second right is superimposed upon rist land, the beneficiary of the second right shares the produce with the owner-tiller.² Rist land is not exempt from land tax as is land held under certain other rights. However, as will be pointed out later, the tax rates are generally lower for rist land than for other land.

Ownership of land may be acquired in a number of ways. It is frequently acquired through inheritance, the Amharic word "rist" meaning inheritance. Under conditions existing at the time of writing, it is in the interest of both the Government and the citizenry for land to be held under private ownership; therefore, land held under other rights is undoubtedly being converted to rist. Ownership can also be acquired through other means including direct purchase, receipt of gift, and receipt of grant from the Emperor.

¹Abera Demissie. West Lafayette, Indiana. Information concerning land tenure in Ethiopia. (Private communication). January, 1957.

²Atherton, op. cit.

These will be discussed more fully in a later section.

Guilt, unlike rist, is not ownership, but is an entitlement to certain remunerative rights over a specified amount of land. This right has seldom, if ever, been granted by the present Emperor.¹ The existence of guilt at the present time is primarily a result of grants made by former emperors being passed on by inheritance despite the fact that guilt is a nominal right and is not supposed to be so transferred.

Prior to the promulgation of the 1931 Constitution, the guilt holder was entitled to retain a portion of all taxes collected, to cultivate for his own profit a portion of the land in the community, and to confiscate land on which taxes had not been paid.² Under the Constitution all such authority has been removed from the hands of local officials and therefore, the status of the guilt holder in the present period of transformation remains in question. Undoubtedly, the amount of guilt land is rapidly decreasing, as is the usefulness of the right to its holder.

It would be to the interest of both the Government and the guilt holder to have guilt converted to rist. There are instances where this appears to have been done, but the

¹D. A. Campanera. Land tenure in Ethiopia. Addis Abeba, Ethiopia. (Unpublished typewritten rept.) (ca. 1955). pp. 2-3.

²Ibid.

mechanics of the conversion are vague.¹

Siso guilt is a right which is related to guilt in that, traditionally, it was superimposed upon rist land. The siso guilt right entitled the beneficiary, usually a local chieftain, to utilize for his own profit a portion of land to which the right was applicable. All labor is the tiller's responsibility. The Amharic word "siso" means one-third, presumably the entitlement due the beneficiary under the right.

As has been true of other guilt rights, siso guilt appears to have been converted, in many instances, to a form of hereditary ownership.² Siso guilt is exempt from land tax; however it is subject to tithe and to the education tax.

The rist guilt right has traditionally been granted exclusively by an emperor to persons who served him, or the State, well. This right is the most preferred of all rights, although, like guilt, it has been made less desirable by taxation regularization set forth under the 1931 Constitution. Originally the rist guilt right constituted an entitlement to collect and to retain the land tax from land-

¹Imperial Ethiopian Government. Ministry of Interior. A short survey of the works of the Ministry of Interior. Addis Abeba, Ethiopia. November, 1955. pp. 19-22.

²Demissie, op. cit.

owners and to use their labor.¹ The Church has been a principal beneficiary of this right.² Any holder of rist guilt may claim exemption from the payment of land tax but may not claim exemption from payment of the tithe and the education tax. There are numerous variations of the rist guilt right.³ Certain of these can be passed on by inheritance from one generation to another. Because of the tax matter, it would be in the interest of the Government to reduce the amount of rist guilt.

Samon is a right by which the Church holds a major portion of its land. This land is commonly considered to be the principal source of income for the Church.⁴

Maderia is a right by which military personnel and war sufferers have been provided an allotment of land. More than any other, this right has been granted by the present Emperor. Land has been granted under this right to injured war veterans, to families of deceased veterans, to refugees, and

¹Christine Sandford. *Ethiopia under Haile Selassie*. J. M. Dent and Son, Ltd. London, England. 1946. pp. 17-18.

²Campanera, op. cit., p. 5.

³Imperial Ethiopian Government, Ministry of Interior, op. cit., p. 37.

⁴Demissie, op. cit.

to reservists.¹ The latter are required to perform a tara, or reserve duty, each year.²

The recipient of maderia land is allowed full use of the land until he surrenders his job or until death. However, ownership under this right is considered to be temporary. The recipient is privileged to keep all of the crop, but he is obliged to pay all government taxes levied against the land.²

Land rights may apply separately or in combination to land held by the Government, the Church, or private individuals. Each will be discussed briefly. Staten has estimated that one-third of the total land in Ethiopia is held by the Government, one-third is held by the Church, and one-third is in large and small private holdings.³

Government land

Government-owned land constitutes a sizable but, as yet, undetermined proportion of the land in Ethiopia. Of course, the viewpoint might be advanced that under a monarchical form of government all land is held directly by the government and that land is merely granted on various terms to the several

¹Imperial Ethiopian Government, Ministry of Interior, op. cit., pp. 20-21, 38.

²Demissie, op. cit.

³H1 W. Staten. Land ownership in Ethiopia. Addis Abeba, Ethiopia. (Personal interview). April, 1954.

categories of subjects. The existence of the previously-described land rights probably could be cited in support of this viewpoint.

Government land in Ethiopia includes government coffee forests, ministry and government farms, forest reserves, concessions, and considerable underdeveloped land which could be made available for settlement.¹ Although the Government has retained land in all provinces it holds a higher proportion of the land in provinces of the Central Plateau than in the outlying provinces.² This is understandable in light of the fact that as the seat of government was shifted successively southward across the Central Plateau it, the Government, came in control of much of the land. With the exception of such areas as the Gurage Subprovince in the southern part, most of the land in Shewa Province is believed to be owned by the Government.³ Sizable government holdings are found in the southwestern part of the country. These lands are utilized in the production of coffee, lumber, and various crops.

¹James C. Atherton. Land resettlement. Report submitted to United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Mimeo.) (ca. 1955).

²Marein, op. cit., p. 251.

³Ibid.

While remaining property of the Government, these lands may be utilized in a number of ways. Some may be let out under one or another land right to individuals who, in turn, will sublease land to tenants. Under such arrangement a portion of the produce is customarily retained by the recipient of the right, or nominal holder, who is responsible to the Government for payment of the land tax. An additional tax, equal to the value of one-tenth of the produce, is paid by the tenant directly to the Government.¹

Neither the tenant nor the nominal holder can become owner of the land unless it is purchased from the Government, or is given to the individual in the form of a grant.¹ Tenants may be removed from the land at will by the nominal holder.

Where land is plentiful and in times when prices are low, tenants may refuse to work the land. Under such conditions the nominal holder is obliged to ask the Government to take back the land. This is usually done, thus relieving the tenant of tax load normally due the nominal holder who, in turn, is relieved of his responsibility toward the Government.¹

Undoubtedly, a certain amount of government land is occupied by persons who have not been so authorized but who

¹Ibid.

have moved onto the vacant or sparsely-settled land. Government farms including livestock farms, coffee plantations, and coffee forests are both numerous and extensive.

Government land is being made available for the use of Ethiopian people. This is evidenced in the release of land for the individual use of veterans of the Italian War and in establishment of the Ambigosa Resettlement Project for army veterans of and following the Italian-War period. Notice of the release of land for veterans of the Italian War was made public in the Amharic edition of the Ethiopian Herald¹ newspaper dated Tikimpt 23, 1945 (Ethiopian calendar), or October 30, 1952 (Gregorian calendar). The English translation of the notice, quoted verbatim, is as follows:

Anybody who holds a [gasha of] government land (400,000 to 520,000 square meters, or .4 square kilometer), one-third of it is granted as his own legal property for the service he has done in the past (Italian War).

Those who were patriots, refugees, [and] veterans (lost part of his body) and have not received a gasha of land according to [the] Hamlie 16, 1934 (July 23, 1942) Proclamation, must make the necessary inquiry to get one through the Ministry of Interior which is in charge of all that.

The 1942 Proclamation provided for veterans to make use of land but did not provide for acquiring legal possession of

¹Notice of land release. (In Amharic, title of article not available. English translation by Makonnen Molla.) Ethiopian Herald, October 30, 1952. (Gregorian calendar). Page 1. Addis Abeba, Ethiopia.

the land.

A second and more recent step toward making land available for veterans is the establishment of the Ambigosa Resettlement Project in northern Arusi Province near the town of Nazret.¹ At present the project is nearing completion and is designed to provide free land for about one thousand veterans of military service. Land allotments vary from 1 gasha for enlisted men to 3 gashas for officers holding the rank of major or above. Additional provision was to be made for housing at a townsite.¹ It is not known, at the time of writing, whether individuals will be granted permanent possession of the land.²

Church land

Traditionally, the Coptic Church has been a major landholder in Ethiopia. This came about primarily as a result of grants of land having been made to the Church by various emperors. However, the Church has also received land in the form of grants from private individuals.³

The Church controls much valuable land. Because Coptic

¹James C. Atherton. Ambigosa (Veterans) resettlement project. Report submitted to United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Typewritten rept.) 1955.

²Atherton, Land tenure in Ethiopia.

³Marein, op. cit., p. 251.

churches are usually built in populated rural communities, which tend to develop in places where water is available and where the soil is productive, the Church not only controls a sizable portion of the land in Ethiopia but it controls some of the most productive land. Church land is generally either rist guilt or samon land.

Traditionally, church land was held as local endowments by individual churches. Land was parceled out to laymen who usually paid two-thirds of the crop and various other charges to the local church. However, this was changed by Decree Number 2 of 1942, whereunder provision was made for all collections to be made by the Central Church Treasury. Thus, although Church land was still to be sharecropped, profits could not be channeled to the local churches. Except for the manner in which collections were to be made, Decree Number 2 did not materially change tenancy arrangements on church-owned land.¹

Church land is, in all cases, exempted from the government land tax.¹ This does not mean that the tenant occupying church-owned land is better off than one occupying government-owned land or privately-owned land. Rather, he is obligated toward the Church instead of toward the

¹Imperial Ethiopian Government. Decree No. 2 of 1942. Made public in Negarit Gazeta of November 30, 1942. Ministry of Pen. Addis Abeba, Ethiopia.

Government. Two-thirds of the produce is the usual share given to the Church. The tithe, amounting to 10 percent of the value of the crop, is paid by the tenant. The education tax is levied against all land including church-held land.

Private ownership of land

Private ownership appears to be on the increase in Ethiopia. After studying for some time the problem of land tenure in Ethiopia, Atherton has made the statement that among Ethiopians there is considerable land ownership among tillers of the soil.¹ Staten has estimated that one-third of the land in Ethiopia is held under private ownership. However, according to Staten, a large proportion of the privately-owned land is held by landed gentry who, in most cases, also hold titled positions and, therefore, spend little or none of their time on the land.²

Ownership of land has always had, and still has, great significance in the social standing of Ethiopians. It is a lifetime goal for many. Traditionally, the rules governing ownership of land have been those laid down by the tribe or the family. These varied from place to place. Unfortunately, there are, to date, few regulations protecting the small land owner. The most important one is found in the revised

¹Atherton, Land Resettlement, p. 2.

²Staten, op. cit.

Constitution set forth by the present Emperor on November 5, 1955, wherein the rights of individuals were recognized, at least in theory, if not in practice. In Article 43 it is stated that "No one within the Empire may be deprived of . . . property without due process of law."

There are four principal ways by which an individual may acquire ownership of land. One way is through a grant of maderia land from the Emperor. This has been discussed in an earlier section.

Second, he may inherit land from his immediate ancestry. If records were faithfully kept in Ethiopia, evidence would be against many such owners having a clear title to land they have inherited because, originally, the land probably was crownland, now government land, which was occupied with either the expressed or silent consent of the ruling authority. So long as a king received tribute from the land, probably he was not particularly concerned by whom, among his subjects, the land was occupied. With the passing of time the undefined claim to such land undoubtedly became more or less binding.

The third way in which an individual may acquire possession of land is through purchase from its legal owner, be it an individual or the Government. Before the transaction may be consummated, if purchase is made from an individual, notice must be given to the district judge because

in Ethiopia no land may be sold or otherwise disposed of without permission of the district judge, a representative of the Government. An unauthorized disposition of land is void.¹ Likewise, in all cases the seller is responsible toward the purchaser for the legality of the sale.² In a case where a sale involves rist owned by a collectivity, the seller, in order to sell his portion of the land, must obtain permission from each member of the collectivity, and each member must be given a preferential right of purchase before the land may be sold. Furthermore, in practice, the seller may ask for a contract including the right of redemption which in effect amounts to granting the purchaser a mortgage and privilege to use the land. The sale of such rist land is not common but when a sale occurs it is most often effected by families in need of money.²

Finally, an individual may acquire land as a gift, usually from an owner not having direct descendants. (This is other than a gift or grant of land to an individual by the Emperor.) Such transfer of land must comply with regulations governing the usual transfer of land by sale.

Private ownership of land prevails in certain provinces in Ethiopia. In Begemdir and Gwojam Provinces where land is

¹Marein, op. cit., p. 250.

²Campanera, op. cit., pp. 4-5.

fairly plentiful, most of the land is claimed to be under private ownership.¹ However, because of the plentifulness of land, inhabitants customarily change plots from year to year. Sometimes the shift is within the boundary of land which the inhabitant owns; sometimes it is not. Amharas predominate among landholders in these two provinces. While some non-Amharas are landholders, most are tenants paying the usual two-thirds of the produce to the landlords.²

In the Gurage Subprovince, situated in the southern part of Shewa Province, and in Arusi Province a large percentage of the farmers are believed to be owners. The writer has had considerable contact with both groups. They are hard working, industrious, and capable farm operators.

In Eritra, to a large extent, and in Tigre Province, to a lesser extent, land is owned by groups or collectivities made up of the inhabitants of a single village or community. This rist land owned by a collectivity is divided equally among the families. Distribution of arable land among the individual farmers is made by a board of community elders.³ Upon being assigned a field, the villager then has

¹Marein, op. cit., p. 250.

²Ibid.

³Beck, Livestock in southeastern Ethiopia.

the right to use the land until a redistribution is made. This may be every three, five, or seven years depending upon the particular community and the nature of the land. Grazing land is used communally by all members of the collectivity. It is to be pointed out that although the grazing land is used communally and the community owns all cultivated land, the collectivity system, at least insofar as crops and livestock are concerned, is not a communal system per se. Neither the grain produced by a farmer in his own plot of ground nor the livestock raised on communal pasture are obligated toward a common store. Rather, the produce is sold or consumed by the farmer and his family.¹

Initially, the plots are laid out so as to be fairly equal in value and productivity.² Actual distribution of the plots may be by lottery so as to give, over a period of years, a fairly equitable distribution of the available arable land. When redistribution is made, one or more plots are, customarily, left unassigned in order that families who may have emigrated from the community may have a source of livelihood should they return.²

In practice, the collectivity system of land holding has certain failings. One has to do with the distribution

¹Ibid.

²Campanera, op. cit., p. 2.

of land by lottery. Frequently a privileged family is given a choice of plots prior to the actual distribution.¹ Furthermore, certain privileged families may, because of prominence or authority, be given additional land. Because plots are similar in size and productivity, a large family might find it difficult to make a living. On the other hand a small family might have more land than it could use; under this circumstance a part of the land might be subleased for the length of the allotment or farming cycle. Perhaps the greatest drawback is that there is no incentive for a farmer to attempt any soil conservation measures. Given a certain field for 3 or 5 years the understandable thinking of the farmer is to get all possible out of the soil while putting as little as possible back into it.

Land taxation

Prior to the Italian invasion, most land taxes were paid in kind, that is, in grain, or livestock.² By Proclamation Number 8 of 1942 entitled "Land Tax Proclamation of 1942" there was established in that year, a tax payable in money. The tax was based upon land broadly classified as to whether it had been measured. On land which had been

¹Staten, op. cit.

²Marein, op. cit., p. 256.

measured and divided into gashas,¹ the tax was further based upon three categories of land; namely, fertile lands, semi-fertile lands, and poor lands.² Unmeasured lands were taxed according to a rate formerly in force.³ Except where there is specific mention to the contrary this tax regulation, like all subsequent tax regulations, applies to land irrespective of the land right or rights which apply thereto.

Thereafter, by Proclamation Number 70 of 1944 entitled "Land Proclamation of 1944" the basic classification of land was expanded and tax rates were varied according to provinces.⁴ The rates in effect for measured land in most provinces as of January 1, 1955 are given in Table 7.

Rates for unmeasured land were included in the proclamation but because these were subsequently changed, they will not be quoted. The rates for measured land set forth in this proclamation showed an increase over the rates

¹Gasha is an area of land equal to 40 hectares or approximately 100 acres.

²Imperial Ethiopian Government. Proclamation No. 8 of 1942. Made public in Negarit Gazeta of March 30, 1942. Ministry of Pen. Addis Abeba, Ethiopia.

³The measurement of land, in most cases, has amounted to chaining the distance between land marks.

⁴Imperial Ethiopian Government. Proclamation No. 70 of 1944. Made public in Negarit Gazeta of November 1, 1944. Ministry of Pen. Addis Abeba, Ethiopia.

Table 7. Rate of land taxes on measured land in nine provinces^a
(Dollars per gasha^b)

Province	Fertile lands			Semi-fertile lands			Poor lands		
	Tithe	Land tax	Total	Tithe	Land tax	Total	Tithe	Land tax	Total
Shewa, Harer									
Arusi, Welo									
Ethiopian dollars	35.00	15.00	50.00	30.00	10.00	40.00	10.00	5.00	15.00
United States dollars	14.00	6.00	20.00	12.00	4.00	16.00	4.00	2.00	6.00
Welega, Sidamo, Ilubabor, Gemu Gwofa, Kefa									
Ethiopian dollars	30.00	15.00	45.00	30.00	10.00	40.00	10.00	5.00	15.00
United States dollars	12.00	6.00	18.00	12.00	4.00	16.00	4.00	2.00	6.00

^aImperial Ethiopian Government. Proclamation No. 70 of 1944. Made public in Negarit Gazeta of November 1, 1947. Ministry of Pen. Addis Abeba, Ethiopia.

^bOne gasha is equal to 40 hectares.

previously in effect. A new taxation classification was introduced by this proclamation. For the first time rist land was given a separate tax classification under which it was made subject to a lighter tax than previously. Because the tax on rist land was revised under a later proclamation, the specific rates given under Proclamation Number 70 will not be quoted.

The rate for the provinces of Gwojam, Begemdir, and Tigre was declared to be that in effect in 1927 plus the estimated tithes, also payable in money.

Certain lands; namely, rist guilt, siso guilt, and samon were exempted from land taxes but were declared subject to tithe until the taxes on such lands could be regularized.¹ Holders of these lands were directed to claim exemption from the Minister of Finance.

By Proclamation Number 117 of 1951 entitled "Land Tax (Amendment) Proclamation of 1951" the land taxes on unmeasured, or gabbar lands, were divided into five categories and were standardized for all provinces.² The rates in effect for unmeasured lands as of January 1, 1955, are given in Table 8.

¹Ibid.

²Imperial Ethiopian Government. Proclamation No. 117 of 1951. Made public in Negarit Gazeta of June 28, 1951. Ministry of Pen. Addis Abeba, Ethiopia.

Table 8. Rate of land taxes on unmeasured land in all provinces^a (Dollars per gasha)^b

Type of tax	1st Class		2nd Class		3rd Class		4th Class		5th Class	
	Eth.	U.S.	Eth.	U.S.	Eth.	U.S.	Eth.	U.S.	Eth.	U.S.
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Tithe	12.00	4.80	10.00	4.00	9.00	3.60	6.00	2.40	3.00	1.20
Land tax	8.00	3.20	7.00	2.80	6.00	2.40	4.00	1.60	2.00	.80
Total	20.00	8.00	17.00	6.80	15.00	6.00	10.00	4.00	5.00	2.00

^aImperial Ethiopian Government. Proclamation No. 117 of 1951. Made public in Negarit Gazeta of June 28, 1951. Ministry of Pen. Addis Abeba, Ethiopia.

^bOn unmeasured land the tax payment is based upon the estimated area of fields.

By the same proclamation, rist was classified into eight categories instead of the previous three. The tax for rist in effect as of January 1, 1955, is given in Table 9. On land where the measured-land tax given in Table 7 and the rist tax given in Table 9 both apply, the tax given in the latter takes precedence.

An inspection of Tables 7 and 9 reveals that in corresponding classes the total land tax for rist is less than half that for measured lands, an advantage for those who own land. However, the lower rate affects only Shewa Province. Classifying land for purposes of taxation is the responsibility of a commission headed by the local governor assisted by four

Table 9. Rate of land taxes on rist in Shewa Province^a
(Dollars per gasha)

Class of land	Tithe		Land tax		Total	
	Eth. \$	U.S. \$	Eth. \$	U.S. \$	Eth. \$	U.S. \$
1	8.00	3.20	12.00	4.80	20.00	8.00
2	7.00	2.80	10.00	4.00	17.00	6.80
3	6.00	2.40	9.00	3.60	15.00	6.00
4	5.00	2.00	8.00	3.20	13.00	5.20
5	4.00	1.60	6.00	2.40	10.00	4.00
6	3.00	1.20	4.00	1.60	7.00	2.80
7	2.00	.80	3.00	1.20	5.00	2.00
8	.50	.20	1.50	.60	2.00	.80

^aImperial Ethiopian Government. Legal Notice No. 154 of 1951. Made public in Negarit Gazeta of June 28, 1951. Ministry of Pen. Addis Abeba, Ethiopia.

local officials.¹

In addition to the aforementioned land taxes, all land in Ethiopia is subject to the education tax as set forth by Proclamation Number 94 of 1947 entitled the "Educational Tax Proclamation of 1947."² The rates for this tax are given in Table 10.

Separate rates were given for the education tax on rist in Shewa. They are given in Table 11.

¹Imperial Ethiopian Government. Legal Notice No. 154 of 1951. Made public in Negarit Gazeta of June 28, 1951. Ministry of Pen. Addis Abeba, Ethiopia.

²Imperial Ethiopian Government. Proclamation No. 94 of 1947. Made public in Negarit Gazeta of November 30, 1947. Ministry of Pen. Addis Abeba, Ethiopia.

Table 10. Rate of educational tax on land in nine provinces^a (Dollars per gasha)

Province	Fertile lands		Semi-fertile lands		Poor lands		Unmeasured lands ^b	
	Eth. \$	U.S. \$	Eth. \$	U.S. \$	Eth. \$	U.S. \$	Eth. \$	U.S. \$
Shewa, Harer, Arusi, Welo	15.00	6.00	12.00	4.80	4.50	1.80	6.00	2.40
Welega, Sidamo, Ilubabor, Gemu Gwofa, Kefa	13.50	5.40	12.00	4.80	4.50	1.80	6.00	2.40

^aImperial Ethiopian Government. Proclamation No. 94 of 1947. Made public in Negarit Gazeta of November 30, 1947. Ministry of Pen. Addis Abeba, Ethiopia.

^bOn unmeasured land the tax is based upon estimated area of fields.

In the provinces of Gwojam, Begemdir, and Tigre, the education tax is 30 percent of the land tax which was in force there in 1927 plus 30 percent of the estimated tithe in money.

It is evident that the amount of tax paid annually by the farmer depends upon a number of factors, viz., whether he is the owner, whether the land has been measured, the province in which the land is situated, and the relative fertility, or productivity of the soil. The education tax

Table 11. Rate of education tax on rist in Shewa Province^a
(Dollars per gasha)

Class of land	Rate	
	Ethiopian dollars	United States dollars
1st	6.00	2.40
2nd	4.50	1.80
3rd	1.50	.60

^aImperial Ethiopian Government. Proclamation Number 94 of 1947. Made public in Negarit Gazeta of November 30, 1947. Ministry of Pen. Addis Abeba, Ethiopia.

is levied against all land in Ethiopia.

The total of government-collected taxes, land taxes plus education tax, on fertile land as of January 1, 1955, varied from Ethiopian \$65 (United States \$26) per gasha on measured land in Harer Province, or in another similarly-classified province, to Ethiopian \$26 (United States \$10.40) per gasha on the most fertile rist land in Shewa Province. The total tax rate per gasha on fertile land in Shewa Province exceeded that on poor land in Harer Province by only Ethiopian \$6.50 (United States \$2.60).

GENERAL AND TECHNICAL EDUCATION

In another section of this study attention was given to the historical significance of the Ethiopian Coptic Church as the traditional center of learning prior to the beginning of the twentieth century. Schooling in the church was primarily of an ecclesiastical nature. In many cases, in the past, this schooling may have amounted to little more than teaching a few children to recite sacred passages in Geez, the liturgical language of the Church.

Emperor Menelik II recognized the great need for education in his country and, in 1905, founded the first state school, Menelik School.¹ It was staffed by four Egyptian Coptic masters and enrolled about 100 boys who received instruction in French, English, mathematics, sports, and drawing.¹ The establishment of the Menelik School marked the entry of the Ethiopian Government into the field of education. The present Emperor, when still regent, began to press for an expansion of Ethiopia's meager educational facilities and in 1925 founded the Tafari Makonnen school which enrolled 80 boys, 30 of whom were boarders.² The

¹Imperial Ethiopian Government. Ministry of Education. Yearbook. 1949-1951. Addis Abeba, Ethiopia. 1952. pp. 89-92.

²Ibid., pp. 92-97.

teaching staff was made up entirely of foreign nationals. He later founded the Lycee Haile Selassie, a primary school.¹

In 1931 Empress Menen established a school bearing her name, providing facilities for education in domestic science for about 80 girls. In addition to the aforementioned schools, there were established in Addis Abeba a primary school attached to a large church and an orphanage for boys. When the Italian Invasion took place in 1935, government schools had been established in Dese, Harer, Jima and in other provincial centers.²

During this period a number of students had been sent abroad for schooling by the present Emperor who, from the beginning of his reign in 1930, has been a fervent supporter of education. Students were sent abroad for study primarily in the fields of law, agriculture, engineering, and medicine. An estimated 125 in all were educated abroad prior to 1935.² The total number of young Ethiopians, exclusive of those who attended church schools, who had received education during the 10-year period ending in 1935 was probably less than 1,000. Few of these survived the Italian Occupation during which there appears to have been carried out a methodical

¹Margery Perham. The government of Ethiopia. Faber and Faber, Ltd. 24 Russell Square, London, England. 1947. p. 247.

²Ibid., pp. 248-249.

extermination of Ethiopian intellectuals. An estimated 75 percent of the educated group were killed, including nearly the entire lot of those educated abroad.^{1,2}

The extent to which the Italians, during the Occupation, undertook to provide education for the Ethiopian masses is not known. Probably very little was accomplished along this line because the Occupation lasted less than 6 years. During that period, the primary concern of the Occupation Government was apparently to provide schools and schooling for Italian children. Nevertheless, the claim has been made that by the middle of 1938 there were 10,298 native students enrolled in 75 schools.³ However, these figures were for the whole of Italian East Africa which includes Ethiopia, Eritra, and Italian Somaliland. In addition to the aforementioned schools, the Occupation Government established, in Eritra and in Sidamo Province, a total of five vocational schools offering training in agriculture and arts and crafts.³ Schooling for Moslems appears to have been encouraged by the Italians in an effort to offset purely Ethiopian influence.

¹Ibid.

²Balambaras Matheme Selassie Wolde Maskal. Information concerning the Italian Occupation. Addis Abeba, Ethiopia. (Personal interview). December, 1954.

³Ferdinando Quaranta. Ethiopia, an Empire in the making. P. S. King and Son, Ltd. 14 Great Smith Street, London, England. 1939.

When the Ethiopian Government was reinstated in 1941, there remained very little of the beginning made prior to the Occupation. Most of the educated had been killed. For many of those who had not completed their schooling in 1935, the long recess meant either beginning again or dropping out. The latter alternative was chosen by many.

The educational system, along with nearly everything else in Ethiopia, was in need of rebuilding. A shortage of teachers, schools, and school equipment which was noted before 1935 was now even more serious. There appears to have been fewer than 10 government schools in operation in the entire country at the time of the Restoration in 1941.

Thus, in 1941 there was begun the building of an educational system in Ethiopia. The survey of general education will be divided into several parts. These include organization and administration, teacher supply and teacher education, and schools and colleges.

Organization and Administration

The Ministry of Education and Fine Arts, hereinafter referred to as the Ministry of Education, was created in 1941¹ for the purpose of shaping and administering national educa-

¹Imperial Ethiopian Government. Ministry of Education. Yearbook. 1947-1949. Addis Abeba, Ethiopia. 1950. p. 8.

tion. The Ministry of Education is responsible for the administration of all schools in Addis Abeba and for the administration of all schools above the eighth grade level in the provinces. Provincial schools below the eighth grade level are administered by the Ministry of Education in collaboration with provincial education officers, one of whom serves in each of the 12 provinces. Administration is concerned with several levels of schooling; namely, primary school, including grades one through four; middle school, including grades five through eight; secondary school, including grades nine through twelve; higher education including scholarship training abroad, and various technical and vocational schools.¹

The organization of the Ministry of Education provides for the appointment of a minister of education and a Board of Education, consisting of from five to 10 members.² The appointment of the minister and the Board of Education is, at present, the responsibility of the Emperor. The holders of both offices are under his direct authority. However, to date, the Emperor has not appointed a minister, preferring to retain that responsibility himself. In practice, much of the work of the minister is delegated to the vice minister

¹Ibid., pp. 10-11.

²Ibid., p. 9.

who is appointed by the Emperor and who is equal in rank and authority to other cabinet officers.¹ The Board of Education is given rather wide statutory powers and is charged primarily with the formulation of policy.

The duties and responsibilities of the minister include the preparation and submission of draft legislation for the furtherance of education within the Empire, the outlining of the nature and content of curricula for various school levels, and the establishment of centers for the promotion of research.² In the absence of the minister, the duties and responsibilities of the office are assumed by the vice minister.

Numerous other officials assist the Board of Education and the vice minister. The director-general is responsible for expending funds in accordance with law, and for the employment of professional personnel. The hiring of foreign teachers which has been, and for some time will continue to be, a large expenditure, is the responsibility of the director-general.³

The superintendent of education is responsible for the

¹William L. Wrinkle. Organization of the Ministry of Education. Addis Abeba, Ethiopia. (Personal interview). January, 1956.

²Imperial Ethiopian Government. Ministry of Education. Yearbook. 1951-1953. Addis Abeba, Ethiopia. 1954. p. 15.

³Ibid., p. 11.

regular inspection of all schools. Inspectors are authorized to visit schools to secure information concerning the administration, facilities, curriculum conformity, and such other matters as are of special interest. The superintendent of education is further responsible for reporting on the suitability of conditions for the establishment of new schools.

The director of provincial education is charged with the responsibility of coordinating the education in the provincial schools. He is supposed to make periodic trips to the provinces in order to gain first-hand knowledge of conditions and school facilities. Because of the high proportion of rural population this should be one of the most important posts in the Ministry. This position was not filled until after 1950. Prior to that time the responsibilities of the office remained with the superintendent of education.¹

Each province has its own provincial educational officer who is responsible to the director of provincial education and whose duties require him, in collaboration with local officials, to adapt the plan of education to local needs commensurate with available staff, buildings, equipment, and financial resources.

As is the case throughout all branches of the Ethiopian Government, provision is made for the hiring of advisers. In

¹Imperial Ethiopian Government, Ministry of Education, Yearbook, 1949-1951, pp. 14-15.

the Ministry of Education the duties of an educational adviser include the gathering of comparative materials on education; the presentation of proposals for meeting the educational needs of Ethiopia with respect to curricula, textbooks, visual aids, and other matters; and, as requested, the preparation of program reports for the guidance of ministry officials.¹

In addition to advisers under direct hire by the Ministry, the United States technical assistance mission to Ethiopia has, from 1952 through the present date, given technical and financial assistance to the Ministry through the Ethiopian-United States Cooperative Education Program. With a staff of about 20 this organization has furthered improvement in the overall educational program in Ethiopia. Certain basic improvements have been brought about. These and matters pertinent to operation of the Ethiopian-United States Cooperative Education Program will be brought out hereinafter.

The growth of education in Ethiopia is reflected in the yearly operating expenditures of the Ministry of Education. The funds expended by the Ministry have risen in amount from 2.7 percent of the total national budgetary expenditure in 1943 to more than 16 percent in 1953, with more than a twenty-fold increase in absolute expenditure having occurred during

¹Ibid.

that 10-year period. In 1953 the budgetary expenditure of the Ministry of Education was larger than that for any other Ministry in the Government.^{1,2}

Education in government schools in Ethiopia is financed through two principal sources, the Central Treasury and the education tax. Prior to 1947, when the education tax was inaugurated, the entire cost of education in government schools was borne by the Central Treasury. In 1953, over 60 percent of the total expended on education was derived from this source; the remainder came from education tax collections.³ Funds from the Central Treasury are used to support all education in government schools except elementary education in the provinces. Thus, it is evident that in 1953 more was spent on education in Addis Abeba than was spent on elementary education in the provinces. Elementary education constituted, in 1953, the principal educational opportunity offered in the provinces. However, it must be pointed out that prior to 1955 most secondary schools were located in Addis Abeba; therefore, students from all provinces benefited from funds expended on secondary education in the Capital.

¹Imperial Ethiopian Government. Ministry of Commerce and Industry. Economic progress of Ethiopia. Ministry of Commerce and Industry. Addis Abeba, Ethiopia. 1955. pp. 104-106.

²Improvement and expansion of Ethiopian teacher education. Report on the conference of the committee on teacher education. May 14-15, 1953. Addis Abeba, Ethiopia. (Mimeo.)

³Imperial Ethiopian Government. Ministry of Education, Yearbook, 1951-1953, pp. 124-125.

The education tax, as has been described in the section dealing with land tenure, was inaugurated in 1947 and is levied against all land in Ethiopia. The return derived from this tax may only be used for elementary education in the provinces wherein the collection is made.

In the case of certain provinces, annual collections made within a four-year period following the implementation of the tax were considerably in excess of expenditures. In other provinces, however, collections fell below the budgetary needs of the province.¹ Perhaps, this is to be expected under the methods of taxation and tax collection used. Improvement may result from more adequate collection techniques. The disparity in financial support for education in the provinces can be seen from Table 12 wherein is given for each province for the period from 1949 through 1951 the average annual expenditure.

With the exception of Tigre, the provinces which have had the lowest per-pupil expenditure are in the southern and southwestern portions of the country. In these provinces little progress has been made in measuring and classifying land.

In setting up the annual budget for the use of education tax funds, each provincial educational officer is requested

¹Imperial Ethiopian Government, Ministry of Education, Yearbook, 1949-1951, p. 208.

Table 12. Education expenditures for government schools in the provinces^a (Average for 3-year period 1949 through 1951)

Province	Annual ex- penditure		Annual en- rollment	Per pupil expenditure	
	Eth \$ ^b	U.S. \$		Eth \$	U.S. \$
Shewa	961,900	384,760	9729	98.87	39.55
Welo	531,000	212,400	2125	249.88	99.95
Begemdir	513,900	205,560	3891	132.07	52.83
Harer ^c	493,000	197,200	5337	92.37	36.95
Arusi	418,000	167,200	2997	139.47	55.79
Sidamo	270,200	108,080	5694	47.45	18.98
Ilubabor	256,400	102,560	4571	56.09	22.44
Gwojam	220,700	88,280	3022	73.03	29.21
Welega	213,800	85,520	3576	59.79	23.91
Tigre	204,500	81,000	3259	62.75	25.10
Kefa	198,800	79,520	2879	69.05	27.62
Gemu Gwofa	60,700	24,280	1099	55.23	22.09

^aAdapted from data presented in Imperial Ethiopian Government. Ministry of Education. Yearbook. 1949-1951. Addis Abeba, Ethiopia. 1952. p. 208.

^bFigures were rounded to the nearest \$100.

^cDate includes one secondary school.

to submit a statement of the needs in his province. Requests from the 12 provinces are then adjusted to best fit the Ministry plan for the expansion of education. The largest single item in the overall budget has been teacher salaries. This item has constituted about one-third of the total. From 1949 through 1956 relatively large expenditures were made for new construction, repair of buildings, and for the operation of boarding schools.^{1,2} Since 1954, however, construction of the latter has been largely discontinued.

The development and expansion of education in Ethiopia has been furthered by financial assistance made available through a joint fund, contributions to which are made by the Ethiopian Government and the United States Government. For the period from late 1952 through December 31, 1955, approximately Ethiopian \$4,100,000 (United States \$1,640,000) were spent through the joint fund arrangement. Approximately 60 percent of this amount was contributed by the Ethiopian Government.³ Joint fund expenditures were in addition to regular Ministry expenditures and were exclusive of joint funds

¹Ibid., p. 208.

²Imperial Ethiopian Government, Ministry of Education, Yearbook, 1951-1953, pp. 124-127.

³William L. Wrinkle. Ethiopian-United States Cooperative Education Program. Report submitted to the United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Mimeo.) (ca. 1955).

used by the Jima Agricultural Technical School and the Imperial Ethiopian College of Agriculture and Mechanical Arts.

In addition to the aforementioned sources supporting education in Ethiopia, a considerable sum is made available through and is utilized by missionary and other private organizations. Because of the many different missionaries and groups involved, the total expended for the support of such schools is not readily available.

Technical assistance was made available to Ethiopia by the United States Government in 1952, 11 years after Restoration. During that 11-year period progress had been made by the Ministry of Education toward its goal of providing educational opportunity for Ethiopian people. From 1952 to the present, the program of the Ministry of Education and that of the United States technical assistance mission to Ethiopia were closely allied. Therefore, no attempt will be made to treat the two separately. The efforts of both were channeled through the Ethiopian-United States Cooperative Education Program. Members of this organization have recognized as fundamental the need for providing a suitable education for a greater number of the Ethiopian people. For some persons this will necessitate higher education in order that positions of responsibility may be filled. For many persons it should provide technical training to make available much-needed skilled labor. For most of the people the need was

for fundamental education which would help unite the diverse groups, many of which retain a separate dialect and unique customs. Fundamental education, as planned, will be fitted closely to the needs of Ethiopia's rural society.

Teacher Supply and Teacher Education

One of the most difficult problems facing the Ministry of Education in Ethiopia is that of providing qualified teachers in sufficient number to meet the needs of the expanding educational program. The need for more and better teachers, though apparent at all levels of schooling, is most pressing at the elementary level, particularly in the provinces.

The teacher problem had its inception during the period immediately following the Restoration when the Ethiopian Government embarked upon a program designed to provide educational opportunity to all youth of elementary and secondary school age commensurate with the country's ability to support the financial burden. Because there were available for employment at that time very few trained Ethiopian teachers, it was necessary (a) to employ, particularly at the elementary level in provincial schools, many who had had no teacher education and (b) to hire foreign personnel for positions that demanded more training and experience. In this manner the teacher problem was temporarily resolved.

In 1953, there were in Ethiopia 422 schools which enrolled less than 60,000 students. The school-age population was then estimated to be over 2,000,000.¹ Thus, about one in 30 persons of school age was enrolled in school. Staffing the 422 schools were 2,319 teachers of whom 306 were foreign and 2,013 were Ethiopians.^{2,3} For the service of the foreign teachers Ethiopia paid, in 1953, Ethiopian \$2.46 million (United States \$984,000). This amount represented more than 45 percent of the total salary budget and more than 21 percent of the entire education budget of Ethiopian \$11.4 million (United States \$4.56 million).³

The foreign teachers were, by and large, holders of a four-year college degree or the equivalent. However, of the 2,013 Ethiopian teachers only four had studied at the college level. Ten had completed secondary school; 31 had had at least 2 years of secondary school. Of the remainder, 160 held eighth grade certificates; 448 had completed the sixth grade; 512 had completed four years; and 848 had completed less than four years of schooling.³ The level of education

¹William L. Wrinkle. Community school for basic education. Report presented at staff meeting of United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Oral). August, 1954.

²Imperial Ethiopian Government, Ministry of Education, op. cit., p. 124.

³Improvement and expansion of Ethiopian teacher education, op. cit., pp. 5-7.

attained by the median of the group of Ethiopian teachers was grade four. Only 205 Ethiopian teachers, or slightly more than 10 percent of all Ethiopian teachers, had completed an elementary education; less than 2.5 percent had advanced beyond. Less than one-fourth of all teachers in Ethiopia, including foreign, had progressed beyond the eighth grade. Thus, if a desirable minimum of 8 years of schooling is held to for teachers, a large number of trained teachers are needed to replace those with less than 8 years who are now employed on an interim basis.

Withdrawals and resignations have placed a further drain upon the limited supply of teachers. In 1953, an estimated 70 dropped out for various reasons including low income, lack of opportunity for advancement, and poor living conditions. The latter was a particularly serious problem in the provinces.¹ The figure of 70 dropouts represented exactly twice the number of qualified teachers who completed schooling in the same year. Dropouts have been highest among the best-qualified teachers.¹

Additional teachers are needed to reduce overcrowding in many schools, to permit the staffing of new schools, and to permit the upward extension of schooling, that is, the addition of higher grades, or forms. It has been estimated that

¹Ibid., pp. 7-8.

a minimum of 500 new teachers will be needed annually to meet the needs of the educational program planned by the Ethiopian-United States Cooperative Program.¹

Prior to 1954, there was one institution in Ethiopia engaged solely in teacher education. That was the Harer Teacher Training School in eastern Ethiopia. Originally established in Addis Abeba in 1944, the school was later moved to Harer where it was reorganized basically along the lines of a secondary school. However, the Harer School offered specialized teacher preparation in addition to the basic secondary curriculum. The latter included Amharic, English, Arithmetic, Geography, hygiene, arts and crafts, and agriculture. The school provided boarding facilities, admitted only boys, and was staffed predominantly with foreign teachers.

The Harer school graduated 35 teachers in 1953. This was half the number who dropped out of teaching the same year and only a fraction of the number of teachers needed annually in the general education program.² Despite the fact that teachers were very much in demand, the Harer Teacher Training

¹William L. Wrinkle. Teacher supply--key to the expansion of Ethiopian education. Report submitted to Ethiopian-United States Cooperative Education Program. Addis Abeba, Ethiopia. (Mimeo.) August, 1954. p. 1.

²Imperial Ethiopian Government, Ministry of Education, op. cit., pp. 49-54.

School was unable, prior to 1954, to enroll enough students to fill its classes.

A number of major changes were made by Ethiopian-United States Cooperative Education Program in the overall educational program. Certain of these changes dealt specifically with the teacher supply problem and were designed to add stability and perpetuity to the teaching profession in Ethiopia. The changes included an expanded program of teacher education, in-service teacher education program, an improved salary schedule, and use of educational measurements either in place of, or in addition to, the traditional tests which have been highly academic in nature.

The Harer Teacher Training School was expanded to graduate 160 teachers in 1954, and according to plan will graduate 600 in 1959.¹ Facilities were expanded to include a more adequate library, teaching aids, and a laboratory elementary school for use in student or practice teaching.

To increase the immediate supply of teachers, steps were taken to expand a one-year teacher education program which had been in operation since 1951. This program was initiated on an experimental basis by the headmaster of one of the largest elementary schools in Addis Abeba. Because of its uniqueness, the program will be described briefly.

¹Wrinkle, op. cit., p. 5.

In September, 1951, teacher education was begun in conjunction with elementary education at the Haile Selassie First Day School in Addis Abeba. Eleven students who had completed the eighth grade were enrolled in a newly-organized four-year teacher education section of the School. An allowance of Ethiopian \$15 (United States \$6) per month was paid by the Ministry of Education to help the students buy food and clothing.¹ Instruction included English, mathematics, science, social studies, and teacher education studies including twice-weekly classroom observation. Students who successfully completed four years of work were required to write a standard achievement examination required of all secondary students. Successful completion of the examination called the Secondary-School-Leaving-Certificate Examination, is required before a preferred teaching certificate can be granted. The initial class of eleven were ready for employment in July, 1955.

To further alleviate the shortage of teachers, a special short-term teacher education program was organized at the same school in 1954. Provision was made to accommodate 120 boys who were at least 18 years of age and who had completed elementary school. The program was organized to give them one year of intensive review of subjects in the elementary

¹Imperial Ethiopian Government, Ministry of Education, op. cit., p. 58.

curriculum with emphasis on methods of teaching those subjects. The one-year teacher education program proved highly successful in relieving the teacher shortage.

The Ethiopian-United States Cooperative Education Program undertook an expansion and improvement of in-service teacher education which had been underway in certain provinces since 1947 and which had, since 1948, been compulsory for all teachers in the provinces. The program of in-service education was expanded to include all provinces. During the three-month period of rain (July, August, and September) short course instruction is now offered at no less than one center in each province. Courses are offered in agriculture, arts and crafts, and health education in addition to refresher courses in the usual academic areas. Personnel from other than the education section of the United States technical assistance mission have assisted with the in-service instruction. The in-service program has been designed to include correspondence instruction and a library of materials that will help the teacher grow professionally and to do a better job of teaching.

The increased interest in teaching, as indicated by the larger number of students entering teacher education, was due in part to recruitment undertaken by the Ministry of Education. It was due in part also to an improved teacher salary schedule submitted by the Ethiopian-United States Cooperative

Education Program and approved by the Board of Education in September, 1953.

The teacher salary schedule recognizes a classification of teachers and administrators based upon the number of years of schooling completed, the amount of professional preparation, and the amount of experience.¹ The schedule, which is in effect at the time of writing, temporarily includes certain teachers who have less than eight years of schooling. Regardless of length of experience, these teachers will eventually be unemployable. Under the new schedule, provision is made for small but specified salary increases to be granted automatically at fixed intervals of teaching service until an established maximum for each salary class is reached.

One important and, for Ethiopia, revolutionary aspect of the schedule is the equality established between sexes and among grade levels with respect to total salary. Men and women with equal qualifications receive equal pay. With equal qualifications teachers in elementary school now are as well paid as those in secondary school teaching. Heretofore, teachers of primary grades had received much lower salaries than those teaching in higher grades or in secondary school. Under the new schedule, monthly salaries paid beginning teachers range from Ethiopian \$60 (United States \$24) for a

¹Wrinkle, Ethiopian-United States Cooperative Education Program, pp. 7-8.

teacher with only an eighth grade certificate to Ethiopian \$450 (United States \$180) for a college graduate holding a bachelor's degree. A teacher who has completed secondary school and who has had an additional year of teacher education could expect a beginning salary of Ethiopian \$250 (United States \$100). Provided the teacher remains in good standing his salary will be automatically raised in increments of Ethiopian \$10 (United States \$4) per year until a maximum of Ethiopian \$350 (United States \$140) is reached in the eleventh year of teaching.

Another advancement in the overall educational program in Ethiopia brought about by the Ethiopian-United States Cooperative Education Program is the use of intelligence and aptitude tests for determining the capabilities of pupils, students and teachers. Although the work of adapting tests to conditions in Ethiopia has only begun, there appears to be great possibility that such tests will be used to partially or entirely replace certain of the purely academic examinations. Previously, the latter have been the only tool used to determine eligibility for matriculation from both primary and secondary school and for determining qualification for entrance into college. The adoption of scientific tests should facilitate the entrance into college of qualified secondary school graduates who have utilized some of their secondary credits in teacher preparation courses. Heretofore

it has been almost impossible for a graduate of the Teacher Training School at Harer to enroll for college-level work in the field of education at the University College.

Real progress has been made in teacher education in Ethiopia. The salary schedule now in effect is among the most modern in the world.¹ The preparation of teachers has grown from none in 1941 to an anticipated 600 per year in 1959.²

Schools and Colleges

The development of agricultural education in Ethiopia is related to and may be expected to parallel the development in general and technical education because educated leaders are needed in all segments of the national economy. Trained business men are needed in the operation of export markets. Engineers are badly needed to build roads. Entomologists and medical technicians are needed to rid valuable unused land of malaria. It would of course be highly desirable for most of the people to be literate in a common language. This would greatly simplify the work of teachers and extension

¹William L. Wrinkle. Ethiopian-United States Cooperative Education Program Accomplishments. Report submitted to United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Mimeo.) December, 1954. p. 2.

²Ibid., pp. 3-6.

workers. Literacy would add greatly to the usefulness of radio and newspapers as mass media of communication. Certain schools, particularly those operated by missionaries, while functioning as fully-standardized schools of general education, offer considerable education and training in agriculture. Finally, it can be assumed that for the immediate future, a sizable part of the agricultural extension will be carried on through community schools.

It is, therefore, appropriate for brief consideration to be given to schools and colleges other than those engaged solely in agricultural education. Consideration will be given to elementary schools, secondary schools, colleges, technical schools, missionary schools, and the community school for basic education.

Elementary schools

The establishment of a system of elementary schools has been one of the principal objectives in the program for expanding education in Ethiopia. Of 508 schools in Ethiopia in 1951, 500 were of elementary standard.¹ The program of elementary education received impetus with the initiation of the education tax of 1947, the proceeds from which are used to support elementary education in the provinces.

¹Imperial Ethiopian Government, Ministry of Education, op. cit., p. 124.

When primary schooling was first made available following the Restoration, there was a reluctance on the part of parents to send their children to school because doing so reduced the labor force on the farm. Few rural families had money to contribute toward the education of their children. Furthermore, initially, the scarcity of schools meant that only a small portion of the students could live at home and walk daily to school. Because of these problems most of the early elementary schools, and most of the secondary schools as well, were organized as boarding schools. Board, room, and supplies were paid for by the Government. Some boarding schools still exist, but, due to the increased number of schools and the necessity of keeping the cost of schooling low, they are being discontinued.

Apparently, there has been a shift in the thinking of people with regard to education because most schools, irrespective of whether boarding privileges are offered, have become crowded, some to the extent that half the pupils attend in the morning and the remainder attend in the afternoon. Other schools have been enlarged one or more times to accommodate the increasing number of pupils.

A limited number of foreign teachers are employed in elementary schools, particularly in the seventh and eighth grades. A majority of the headmasters of urban elementary schools also are of foreign birth. The teachers of lower

grades, the physical education teachers, and the Amharic language teachers are, with few exceptions, Ethiopian.

The better elementary schools in most cases have been staffed and equipped to offer eight years of schooling including four years of primary work and four years of middle-school instruction. A large percentage of such schools are in urban communities. Relatively few rural elementary schools fit the aforementioned description of superior schools. Many are one-room, dimly lighted schools with few facilities beyond a number of wooden benches on a dirt floor and a few worn text books which are rotated among students in order that everyone may have an opportunity to use them. Because of a shortage of teachers, the undesirable living conditions in remote areas, and the frequent necessity of teaching in an alien dialect or language, there has been much difficulty in securing teachers for such schools. At best, the quality of teaching is low and few pupils who have had their elementary schooling under these conditions have reached secondary school.

According to a 1946 regulation of the Ministry of Education, new structures in rural areas must conform to one of four types.¹ The class "A" school, one of which would be constructed in every provincial city, would have eight or

¹Imperial Ethiopian Government, Ministry of Education, Yearbook, 1947-1949, pp. 44, 91.

more classrooms with an auditorium for the use both by the students and the community. A class "B" school would have from six to eight classrooms with or without an auditorium. A class "C" school would have from four to six classrooms with or without an auditorium. Each principal town would, according to the plan, have either a class "B" or class "C" school. Outlying districts would be provided with a class "D" school, a permanent structure with up to three classrooms. Prior to the 1946 regulation, a fifth class school, class "E", was recognized. This was a temporary type structure. Despite the fact that the aforementioned regulation was made effective in 1946, at the time of writing, many of the small schools in outlying districts must be classified as class "E" schools.

Thus, it can be seen that the type of structure used for elementary schools varies widely. There is a general inverse relationship between adequacy of school facilities and distance from the central part of the Empire. The problem of supplying materials and workmen to build suitable structures in the remote areas is a very real one and will probably remain so until better transportation facilities become available. In contrast to this situation, some of the larger communities have modern stone structures with well-lighted classrooms, sanitary plumbing, and auditorium facilities. Unfortunately, even the best schools are over-

crowded.

A concerted effort has been made by the Ministry of Education to standardize the curriculum in elementary schools. However, there still remains a wide divergency between the quality and quantity of instruction offered in large schools and that offered in one-room rural schools.¹ There has been a tendency for teachers, many of whom have had no specialized training, to teach from personal experience, a practice that leads to overemphasis in some areas and underemphasis in others. Many of the widely-used texts were written in the United Kingdom or the United States and are thus ill-fitted for use in Ethiopia.

The elementary school curriculum includes Amharic language, arithmetic, history, and physical education. Basic science and rudimentary crafts are offered in larger schools. A study of English is begun in the third grade.² Learning is imparted primarily by rote, a memorization process which does not require the pupil to reason. The typical pupil may be able to recite long passages from literature or repeat glibly long and complicated formulae, but he can rarely apply the information. Facilities for reasoning and for problem solving are poorly developed under educational

¹Ibid., pp. 30-34.

²Imperial Ethiopian Government, Ministry of Education, Yearbook, 1951-1953, pp. 36-37.

practices followed in Ethiopia.

The language problem has been a deterrent to the progress of pupils at the elementary level. All who have grown up in communities where Amharic is not regularly spoken are required to learn that language before beginning elementary school. Studies are carried on in Amharic through the third grade during which grade the study of English is begun. Following the third grade all instruction is in English. The shift from one language to another is no less a problem for the teacher.

Limited attention has been given to co-education in government schools. The number of girls enrolled in government elementary schools rose from negligibly few in 1941 to 7,154 in 1953. At the time of writing, most government primary schools in Ethiopia are co-educational.¹ Certain schools accept girls only. However, there has been a far greater number of boys trained than girls. In 1953, in government elementary schools there was a ratio slightly wider than 7 to 1 in favor of boys.² The curriculum offered girls in co-educational elementary schools is essentially the same as that offered to boys.

Upon completion of elementary school every pupil who

¹Ibid., pp. 32-33

²Ibid., p. 129.

wishes to enter a secondary school must write a general examination administered by the director of teacher training of the Ministry of Education.¹ A small percentage of the total number of rural elementary students from both government and private schools write the examination, and still fewer pass it. In 1953, a total of 496 rural boys wrote the examination; 272 passed. Nineteen rural girls wrote, and eight passed.² The number of boys who passed the examination that year represented about .6 percent of the 43,968 boys enrolled in rural schools. A corresponding .1 percent of the girls from rural schools became eligible for further education.

Rote learning and memorization have been heavily stressed in Ethiopian schools with the result that, generally, pupils neither learn the technique of problem solving through reasoning nor the skills which are developed through use of the hands. Manual labor is looked upon with distaste. The ultimate desire for most educated persons in Ethiopia is to secure government or other office employment.

A departure from the traditional thinking appeared in the following quotation taken from the Ministry of Education

¹Ibid., pp. 20-21.

²Ibid., p. 132.

Yearbook:¹

There is the evolving concept in Ethiopian public education to shift from passive assimilation of the academic to one of practical work and experience.

It was further stated that there was need for a type of schooling which would not only provide rural people with a knowledge of the language but which would be of direct use in producing the family food supply and in meeting other necessities of life.

Thus, there was a receptive response on the part of Ministry officials to a proposed program of community school education submitted to them in March, 1954, by the Long-Term Planning Committee composed of staff members of the Ethiopian-United States Cooperative Education Program.² At the time of writing, the community school program has advanced slightly beyond the planning stage. However, because it appears to hold prospect for the future of agricultural education, it will be given special attention in a separate section.

Secondary schools

As of 1955 there were 38 secondary schools in Ethiopia, including Eritra. The curriculum in secondary schools has,

¹Imperial Ethiopian Government, Ministry of Education, Yearbook, 1949-1951, p. 5.

²Long-Term plan for the reorganization and development of education in Ethiopia. Report obtained from the files of the Ethiopian-United States Cooperative Education Program. Addis Abeba, Ethiopia. (Mimeo.) June, 1954. p. 1.

traditionally, stressed the preparation of candidates for writing two examinations. The first, which is called the Secondary-School-Leaving-Certificate Examination, is taken after the student has completed his secondary schooling. The second is called the Certificate of Education Examination, formerly the London Matriculation Examination, and is taken prior to entrance into college. Emphasis on these examinations has necessitated the offering of intensified instruction in English, geography, history, mathematics, and basic science. Amharic, French, art, music, and physical education are also commonly offered in the curriculum of secondary schools. Sometimes, limited instruction in handicrafts is included. The Haile Selassie First Secondary School and the General Wingate Secondary School, two of the leading secondary schools in Addis Abeba, have inaugurated five-year programs in order to better prepare candidates for examinations.¹

With the exception of instructors of Amharic language, most of the teachers employed in secondary schools have been foreign-born teachers. In 1954, in secondary schools there were 77 foreign teachers and headmasters on the Ministry of Education payroll. A number of Ethiopians have undertaken study abroad leading toward a degree in education and, in

¹Imperial Ethiopian Government, Ministry of Education, op. cit., pp. 100, 108.

1955, a total of 25 Ethiopian students enrolled for such education at the University College. The completion of this study would qualify them for secondary level teaching. Many of these students should be ready for employment in the near future.¹

College-level institutions

At the time of writing there were four principal institutions offering education beyond the secondary level. These are the Imperial Ethiopian College of Agriculture and Mechanical Arts, the Jima Agricultural Technical School, The University College, and the Technical College. The two first-mentioned institutions will be discussed in another section dealing specifically with education in agriculture; the two last mentioned will be given brief consideration here.

The University College, which opened for instruction on December 11, 1950, was the first college-level institution in Ethiopia.² It was established in order to relieve the Government of a portion of its financial burden incurred in sending students abroad for higher education. At the University College a bachelor's degree is offered in both arts and science. Instruction is also offered in such areas as law

¹Wrinkle, Ethiopian-United States Cooperative Education Program, p. 8.

²Imperial Ethiopian Government, Ministry of Education, Yearbook, 1951-1953, pp. 59-64.

and port administration. In 1955, provision was made for offering a college degree in teacher education.¹

The beginning of the Technical College traces to 1951 when an American engineer and educator, Robert L. Lewis, was called to Ethiopia for the purpose of organizing a college of engineering. After studying conditions in Ethiopia, he recommended that early attention be given to the training of technicians rather than engineers.² Accordingly, there was undertaken a reorganization of the Technical School, in conjunction with which the Technical College was to have been operated. The latter was not opened until late in 1954, at which time there were available too few qualified secondary students to establish a beginning enrollment. Special arrangements had to be made to accept superior students from the Technical School.

Fourteen students were enrolled in 1954-55 in basic work leading toward a bachelor's degree in either of two areas, civil engineering or industrial engineering.² Prior to 1956 there had not been obtained sufficient equipment and facilities to allow the college to offer more than the initial two

¹William L. Wrinkle. Preparation of teachers for Ethiopian government secondary schools. Report to the Long-Term Planning Committee of the Ethiopian-United States Cooperative Education Program. Addis Abeba, Ethiopia. March, 1955. pp. 1-5.

²M. W. Roney. Technical education in Ethiopia. Technical Education News 13, No. 2:9-11. March, 1954.

years of instruction in engineering. Eight students were sent abroad, principally to the United States for the final two years of work. However, as of January, 1956, preparation was underway to offer the third year beginning in September, 1956, and the fourth year in 1957.

No work is offered specifically in agriculture by either the University College or the Technical College. In light of the importance of agriculture in Ethiopia, it would appear that the teacher education program in the University College should give some attention to agriculture in the curriculum. At the time of writing no such plans are underway. There is no indication that agricultural engineering will be added to the offering of the Technical College in the immediate future.

Technical schools

There are many schools which offer technical and vocational training. Certain of these schools offer a four-year program and a secondary school certificate. Most schools, however, are service schools organized to train personnel for various specific occupations. A selected list of technical and vocational schools together with certain pertinent information concerning each is presented in Table 13.

None of these schools offers training directly related to agriculture. However, students from two schools have been

Table 13. Post-primary schools offering specialized training^{a, b}

Name of school	Sex of trainees	Level of instruction	Nature of specialization
Her Imperial Majesty's Handicraft School	Both	variable	Most handicrafts
Technical School	Male	9-to-12	Trades, and industrial arts
Commercial school	Both	9-to-12	Commercial
Empress Menen school	Female	9-to-11	Domestic science
Haile Selassie First Military School	Male	variable	Army officer
Imperial Guard Training Center	Male	variable	Imperial Guard officer
Air Force Training Center	Male	variable	Maintenance and flight crews
Aba Dina Police College	Male	variable	Police officer
Theological School	Male	variable	Clergy
Nurses and Dressers schools	Both	9-to-11	Practical nursing
Music school	Both	6-to-12	Music
Telecommunication Institute	Both	variable	All aspects of communication
Haile Selassie First Blind School	Both	1-to-4	School for blind
Berhane Zarie Neo Institute	Both	variable	Adult education

^aImperial Ethiopian Government. Ministry of Education. Yearbook. 1949-1951. Addis Abeba, Ethiopia. 1952. pp. 174-198.

^bImperial Ethiopian Government. Ministry of Education. Yearbook. 1951-1953. Addis Abeba, Ethiopia. 1954. pp. 104-121.

employed as teachers in areas indirectly related to agriculture. Students from the Handicraft School have been recruited for teaching such crafts as carpentry, rug making, weaving, and rope making. Teachers have been recruited from the Technical School also. This school offers secondary-level education in various areas of specialization. These include machine shop, automotive mechanics, building construction, metal working, and carpentry.

Missionary schools

Mission schools are important in the overall education program. They are particularly important in the agricultural education program. Mission schools are frequently situated in the remote areas. Thus, through mission schools, there is established a real and direct contact with many Ethiopians who would otherwise receive little or no exposure to education. Because mission stations and schools are situated in remote areas, they depend largely upon local agriculture for their food supply. Many missionary schools now employ trained agriculturalists. These individuals not only assume responsibility for producing much of the mission's food supply but are also able to assist in the education of local people. Agricultural missionaries are in a position to give valuable assistance to native farmers, because they, the agricultural missionaries, live amongst the people, know the

language, and in most cases hold long continuous contact with people in the community.

From the standpoint of teacher qualification, mission schools, at the present time, are probably superior to government schools. Few missionaries with less than two years of college training are sent to the field. Most hold a college degree. Ethiopian instructors, who teach in missionary schools, are selected only after close observation. In most instances they are given a great deal of individual instruction and assistance by mission supervisors.

Furthermore, despite the fact that missionaries themselves are often poorly paid, mission stations are not without equipment, sometimes very excellent equipment including farm machinery, electrical generating units, shop tools, and film projectors all of which greatly enhance the quality of the educational program offered.

From the standpoint of the potential benefit which could be derived from missionary schools, it is unfortunate that there are not more of them in the country. The 1953 total was 119 stations only part of which operated schools.¹ In that year there were 6,717 students enrolled in missionary schools. This figure represents about one-tenth the number of students enrolled in government schools in the same year.

¹Imperial Ethiopian Government, Ministry of Education, op. cit., pp. 110-113.

The number and location of missionary schools are controlled by the Committee on Missions composed of representatives from several ministries and headed by the director-general of education. The Committee has been given authority to designate those areas where Coptic Christianity predominates as "Ethiopian Church areas." Missionaries are barred from such areas. Other areas have been designated as "open areas." Addis Abeba has been designated as an open area.¹ The Committee has long stipulated that all instruction, after an initial break-in period, be in Amharic.

Although not directly under the Ministry of Education, missionary schools must comply with all Ministry regulations regarding curriculum and standards. Because of this, students who complete their elementary education in mission schools may sit for the general examination and, if successful therein, may continue in any secondary school in Ethiopia.

Most mission schools offer elementary-level schooling with some additional instruction on the secondary level. This may include limited teacher education primarily useful in preparing Ethiopians for teaching responsibilities within the mission. Nearly all missions utilize Ethiopian teachers in one capacity or another. A limited number of mission schools offer adult classes. Generally, these classes are of

¹Imperial Ethiopian Government, Ministry of Education, op. cit., pp. 110-113.

a religious nature.

Community school for basic education

Although progress has been made toward extending educational opportunity in Ethiopia, at the time of writing the goal of providing such opportunity to all is far from being attained. In 1953 there were 422 government schools which enrolled somewhat more than 60,000 students.¹ This figure represented only about one in 33 of the estimated 2,000,000 persons of school age in Ethiopia. In 1954 Wrinkle estimated that, exclusive of those who had attended schools of the Coptic Christian Church, less than 5 percent of the population had had any school experience.²

One undesirable feature of the educational system in Ethiopia has been the relative underdevelopment of education at lower levels in relation to that at higher levels. There are too few secondary schools to provide enough well-qualified college entrants. There are too few pupils completing middle school, grades five through eight, to meet the demands for employment and for secondary school enrollment.

The development of primary schools has been uniquely

¹Ibid., pp. 124-125.

²Wrinkle, The community school for basic education.

inadequate. First, there are few primary schools in proportion to the country's needs; and these schools are unevenly distributed among the provinces. An estimated 50 percent of the people in Ethiopia, a country which has 53 languages and dialects, do not speak Amharic, the national language.

Second, too little attention has been given to standards with the result that teacher qualifications have been very low; teaching materials have been inadequate; and there has been much overcrowding. Third, many schools counted as primary schools offer no more than the first grade. Fourth, virtually nothing has been offered at the community level to improve community life, health, or agriculture. There are no satisfactory facilities at the community level for the dissemination of new ideas and improved practices and procedures.

The community school program may be divided logically into two parts. One aspect of the program deals with the school in the community. This part of the program is in the planning stage. The other aspect of the program deals with the training of teachers who will staff the schools. This phase of the program has been initiated. The present discussion of the community school program must, therefore, deal partly with proposals and recommendations and partly with activities already implemented.

The community school as proposed. Toward the

remediation of the aforementioned weaknesses of the educational system, particularly at the community level, the Long-Term Planning Committee of the Ethiopian-United States Cooperative Education Program in December, 1953, proposed the establishment of a new-type school, the community school for basic education. This type of school was designed to extend educational opportunity throughout the Empire as rapidly as available financing will permit. The Committee subsequently supported the original proposal with two lists of recommendations outlining the organization of the community school. One list was submitted to the Board of Education on March 22, 1954, and was approved with slight modification on June 17, 1954.¹ The other was submitted the following year and was approved with slight modification on February 25, 1955.²

As proposed by the Long-Term Planning Committee, the community school for basic education should make available to all Ethiopian people, commensurate with the available supply of teachers and provincial and community financial support, a basic four-year education adapted primarily to the needs of

¹Long-Term plan for the reorganization and development of education in Ethiopia, op. cit., p. 1.

²Bellefeu Gabre-Tsadik and W. L. Wrinkle. The controlled expansion of Ethiopian education. A special report to the Long-Term Planning Committee of the Ethiopian-United States Cooperative Education Program. Part IV. March, 1955. Addis Abeba, Ethiopia. (Mimeo.)

rural people. Broadly speaking, the functions of basic education as proposed are (a) to promote mass literacy in the official native language and (b) to develop basic abilities which will enable every citizen, both young and old, to meet more effectively the problems in everyday living and make a greater contribution toward the advancement of his community and the Empire.¹

To achieve these broad functions it has been proposed that the instructional program of the community school be divided into two parts. One part of the program will be concerned with classroom instruction in such areas of study as the native language, history, geography, health, and agriculture. The other part will be concerned with out-of-classroom instruction dealing with problems in community living, health, and agriculture. The latter will be given major emphasis.²

Because of the twofold nature of the instructional program of the community school, it has been proposed that each school be staffed with a minimum of two teachers during the first year of the school's operation when only one grade,

¹Frederick H. Bair. Preliminary steps in establishing the community school for basic education in Ethiopia. Report submitted to the Long-Term Planning Committee of the Ethiopian-United States Cooperation Education Program. Addis Abeba, Ethiopia. (Mimeo.) (ca. 1955).

²Frederick H. Bair. Community school for basic education. Addis Abeba, Ethiopia. (Personal interview). January, 1956.

the first grade, would be offered. One teacher would be primarily responsible for the classroom instruction and would be called a community teacher. The other would be primarily responsible for adult, or out-of-classroom instruction, and would be called a community leader.¹ In order to have one teacher for each grade, a second community teacher would be added to the staff at the beginning of the second school year. A third teacher would be added at the beginning of the third year of operation and a fourth would be added when the original class was ready for the fourth and final grade. During and following the fourth year of the operation of the school, the staff would number five and would include four community teachers and one community leader.

Because both types of teachers, particularly the leader, would be working with adults it was considered imperative that they, the teachers, have maturity, breadth of interest and resourcefulness, a broad understanding of community problems, and the ability to secure the respect of and to work successfully with adults.¹ It was further suggested that only the most capable persons be recruited for assignment in community schools; and, of those recruited, the most capable should be channeled into the position of community leaders. Initially, each leader would be required to supervise the

¹Gabre-Tsadik and Wrinkle, op. cit., pp. 7-9.

school in the capacity of superintendent.¹

In order to obtain the best qualified teachers and leaders for the community school for basic education, the Committee suggested that selection be made from among primary teachers with outstanding qualifications who have had teaching experience in primary schools. It was recommended that teachers be selected from among those with at least two years of experience.² Because of the many languages and dialects in Ethiopia it was considered highly desirable, if not essential, that teachers recruited for the community school program be fluent in at least two native languages or dialects.

Under the proposed plan teachers and leaders would receive about one and one-half times as much pay as comparably-qualified teachers employed in Addis Abeba.³ The Committee also recommended that housing be provided free of charge to teachers and leaders. A special school was proposed for the preparation of teachers and leaders. This will be discussed in a succeeding section.

Because most community schools will be established in communities which, previously, will have had no schools, it

¹Bair, op. cit.

²Gabre-Tsadik and Wrinkle, op. cit., pp. 27-28.

³Ibid., p. 5.

is expected that more people will seek admission to classes than can be admitted and still permit the teacher to achieve the most desirable results. For this reason it has been proposed that a maximum of 40 students be admitted to each grade.¹ In this connection it was deemed inadvisable, for the time being, to set a maximum age limit for admission. It was recommended that, normally, age seven be considered a minimum for entry except where students needed preliminary study in Amharic, in which case students would be admitted at age six.

It was recommended that provision be made for at least the more capable students to be advanced to middle school, grades five through eight. Should this number be large, there will eventually have to be an increase in the number of middle schools.

Due to the time required for the preparation of teachers and due to the organizational and financial problems involved in establishing a system of community schools, it was recommended that about 35 schools be opened during any one year for the foreseeable future.¹ Twenty-five would be new schools and 10 would be established in centers which now have primary schools offering one or, at most, two grades. In this way the Government school system would be upgraded; some

¹Bair, op. cit.

construction and other costs would be saved; and communities which have already had some exposure to education would be able to benefit from the out-of-classroom instruction.

The manner in which community schools will be financed, constructed, and maintained, as proposed by the Committee, is unique. It was recommended that, insofar as possible, the school should be made a community or local responsibility. It was proposed that the impetus for bringing a school to the community be allowed to stem from the community itself. The Committee recommended that the Ministry of Education assume the initiative only in instances where the community does not request the establishment of a school. It is anticipated that the requests for the establishment of schools will far exceed the quota of 35 per year.¹ In this connection the Committee has recommended that steps be taken to assure an equitable distribution of schools among the 12 provinces and Eritra.

The community, when requesting the establishment of a school, must guarantee funds and labor for the construction and maintenance of the building. Furthermore, provision must be made at the provincial level for payment of teacher's salaries. Where feasible, materials used in the construction of the school and teacher living quarters are to be obtained

¹Gabre-Tsadik and Wrinkle, op. cit., pp. 5-6.

from a local source.¹

According to plan, the Government or Ministry of Education would assume the responsibility of recruiting and educating teachers and leaders. As proposed by the Committee, this would entail the appointment of a committee to set up a workable procedure for recruiting community school teachers and leaders from among successful primary school teachers. Before the teachers could assume their duties they would be given about one year of intensive instruction at a special teacher education center. In addition to its responsibility in supplying teachers, the Ministry would provide detailed specifications for the construction of the school building. This would include size of building, number of classrooms, window space, facilities, and equipment. The Ministry would also assume the responsibility of producing Amharic materials and making them available to schools.

Teacher education center. Because community teachers and community leaders will need special preparation for their respective assignments in community schools, it was proposed by the Long-Term Planning Committee that a community school teacher education center be established. As of January 25, 1957, such a center was opened for instruction. It will be

¹Ibid., p. 28.

described briefly.¹

Two gashas of fertile land have been made available for the center near the village of Debre Birhan which is situated on the high plateau about 125 kilometers (77.6 miles) north-east of Addis Abeba. An all-weather road has been constructed to connect the site with a nearby cross-country highway. A relatively pure supply of water has been tapped for domestic use. Stream water is available for irrigation. A dense stand of eucalyptus on the school property will provide fuel, shelter from the wind, and some timber. The center is electrified.

A rather extensive building construction program was undertaken to provide housing and facilities for the center. To date, the list of buildings constructed includes six classrooms, 10 staff houses, one house for the director, 48 houses for married students, and 48 rooms for single students, a laundry, a bakery, and garage. The principal building material was stone quarried on the site.

An all-Ethiopian staff of 12 persons has been selected for the center. This is the first school in Ethiopia above the ninth grade that is staffed by nationals only. The staff members were chosen from among personnel who had a desirable combination of education, experience, and ability. They were

¹Frederick H. Bair. Washington, D. C. Recent developments in the community school program. (Private communication). April, 1957.

given a 6-week preliminary training course in Addis Abeba prior to taking up their responsibilities at Debre Birhan. During this period staff members were given an opportunity to become familiar with recently-developed educational materials which are now being published in Amharic.

The selections of prospective community school leaders and teachers has been made the responsibility of a committee headed by Ato Mammo Wolde Senbet who, though relatively young, has been an energetic supporter of the community school movement in Ethiopia. As was pointed out previously, prospective leaders and teachers are to be chosen on the basis of education and previous experience. A total of 90 enrollees including 45 community leaders and 45 community teachers were selected for the first year at the training center. This number is somewhat in excess of that originally proposed but it is well within the facilities of the center.

The length of instruction was originally suggested as one year. However, because the center became operative in the middle of the regular school year, the decision was reached to retain the students for 1.5 years. This should be to the benefit of students and staff alike. The extension of the period of instruction will delay the opening of the first wave of community schools to September, 1958. Under the original plan the first schools were to be opened in September, 1957.

Instruction is being given in arithmetic, social studies, Amharic language, health, adult education and village organization, heavy crafts, and agriculture. The staff includes one woman who will teach the wives of students cooking, sewing, baby care and other domestic arts of value to those living in rural areas. It is planned that personnel from various ministries, from schools and colleges, and from technical assistance organizations and from other agencies may be called upon to assist in the teacher education program.

At the time of writing full details have not been worked out regarding the exact nature and content of the instruction to be offered in the area of agriculture. However, it is known that the instruction will include the fundamentals of crop and livestock production and improvement, the irrigation of crops, the preparation of agricultural products for market with reference to maintaining quality; the preservation and storage of agricultural produce for home use, and the construction of various types of shelters.

From the standpoint of giving students an understanding of and experience in producing typical agricultural crops, the Debre Birhan site was ill-chosen. The 8,500-foot altitude will permit the raising of few crops other than barley and wheat. Corn and sorghum, two of the principal food crops in Ethiopia, cannot be grown successfully at this altitude.

One solution to the problem of producing warm-weather crops might be to grow them at the base of the nearby escarpment or in the deep gorge of the Baressa River. The elevation in either case is about 2000 feet below that of the plateau at Debre Birhan.

AGRICULTURAL EDUCATION PROGRAMS EXCLUSIVE OF
THOSE IN SCHOOLS AND COLLEGES

Agricultural education in Ethiopia has been notably furthered through programs of supply and technical assistance carried on by humanitarian organizations of various governments outside of Ethiopia. Three organizations have been primarily responsible for progress made in agricultural education. These are (a) the United Nations Relief and Rehabilitation Administration, (b) the United Nations Food and Agriculture Organization, and (c) the United States technical assistance mission. Certain activities supported by the programs of these agencies were of a purely educational nature. Other activities were primarily of a service nature. However, in connection with most service projects, some form of training was carried out. The present discussion will include activities of the latter type. The most important activities carried on by each of the three agencies will be discussed.

United Nations Relief and Rehabilitation
Administration

This organization was created as a part of the United Nations in 1943 for the purpose of providing war-devastated

countries with the supplies and services necessary to permit a resumption of agricultural and industrial production.¹

Under the original agreement signed by the representatives of 44 governments including Ethiopia, provision was made for the cost of the program to be borne by the member governments.²

Ethiopia's share of the original budget of Ethiopian \$25,000,000 (United States \$10,000,000) was .05 percent. However, on September 18, 1946, Ethiopia was adjudged unable to pay for her program and, as of that date, was relieved of further financial obligation toward the Administration.³

The United Nations Relief and Rehabilitation Administration became operative in Ethiopia on July 4, 1946. It provided to Ethiopia a program which consisted principally of supply assistance. Only limited service or technical assistance, was made available. The cost of the total program was not to exceed Ethiopian \$2,500,000 (United States \$1,000,000). The weight and value of all supplies delivered

¹United Nations Relief and Rehabilitation Administration. Selected documents of the first session of the council. Atlantic City, New Jersey. November 10--December 1, 1943. Department of State Publication 2040. Washington, D. C. 1944. pp. 12-14.

²Ibid., p. 17.

³United Nations Relief and Rehabilitation Administration. Report of the director general to the council for the period July 1, 1946, to September 30, 1946. (Publisher not given). Washington, D. C. 1947. p. 152.

Table 14. Supplies provided to Ethiopia by the United Nations Relief and Rehabilitation Administration^a (July 4, 1946, through December 31, 1947)

Item	Weight (Gross long tons)	Value	
		Ethiopian dollars	United States dollars
Food	11	8,500	3,400
Clothing, textiles and footwear	b	3,750	1,500
Medical and sanitation	631	1,025,500	410,200
Agricultural rehabilitation	831	942,250	376,900
Agricultural training materials	c	112,500	45,000
Industrial rehabilitation	78	232,250	92,900
Total	1,551	2,324,750	929,900

^aUnited Nations Relief and Rehabilitation Administration. Report of the director general to the council for the period July 1, 1947, to December 31, 1947, and summary of operations November 9, 1943, to December 31, 1947. Washington, D. C. 1948. pp. 203-204.

^bLess than 1 ton.

^cWeight not available.

to Ethiopia as of December 31, 1947, at which time the program was essentially completed, are shown in Table 14. The agricultural training materials were provided through a special fund. The Brethren Service Committee, a United States voluntary organization, assisted by providing live-

stock and a number of specialists.¹

The proportion of various supplies, as seen from Table 14, reflects the lack of sanitation and the scarcity of agricultural tools which prevailed in Ethiopia at that time. Very little food and clothing were provided to Ethiopia, but relatively large amounts of medical and agricultural supplies were provided. The medical supply and assistance program will not be discussed. It should be pointed out, however, that considerably more effort was made by the Administration to train medical teams than was made to train agricultural leaders and technicians.

The agricultural improvement program centered around the agricultural supplies provided to Ethiopia. A total of 831 gross long tons of agricultural equipment and supplies valued at Ethiopian \$942,250 (United States \$376,900) were provided to the country. This amount, plus Ethiopian \$112,500 (United States \$45,000) worth of agricultural training materials, brought the total allotted to agricultural improvement to Ethiopian \$1,054,750 (United States \$421,900). A breakdown by type of supply is shown in Table 15.

¹United Nations Relief and Rehabilitation Administration. Report of the director general to the council for the period July 1, 1947, to December 31, 1947, and summary of operations November 9, 1943, to December 31, 1947. Washington, D. C. 1948. pp. 212-213.

Table 15. Agricultural supplies provided to Ethiopia by the United States Relief and Rehabilitation Administration^a (July 4, 1946 through December 31, 1947)

Supply	Value	
	Ethiopian dollars	United States dollars
Farm implements and machines	463,750	185,500
Hand tools	61,250	24,500 ^b
Livestock, veterinary supplies and dairy equipment	350,000	140,000 ^b
Agricultural training material	112,500	45,000
Miscellaneous supplies	67,250	26,900 ^b
Total	1,054,750	421,900

^aUnited Nations Relief and Rehabilitation Administration. Report of the director general to the council for the period July 1, 1947, to December 31, 1947, and summary of operations November 9, 1943, to December 31, 1947. Washington, D. C. 1948. pp. 212-213.

^bEstimate.

Equipment and tools

The inventory of agricultural equipment and tools included two D-4 Caterpillar tractors, about 10 Ford-Ferguson tractors, tillage implements, grain seeders, haying implements, grain binders, about 4000 small turning plows, mule harness, machetes, garden tools, and a wide variety of supplies.

The disposition of equipment and tools, and likewise of

all supplies provided by the Administration, was left to the Ethiopian Government. The latter, in its ultra-conservative manner, made only limited distribution of supplies and equipment. Initially, the entire inventory of United Nations Relief and Rehabilitation Administration supplies and equipment was stored in warehouses near the Capital. Small amounts of supplies and equipment were released through arrangement made with the Ministry of Agriculture.

Of the equipment released soon after its arrival in Ethiopia, considerable was given to schools and training institutions. A D-4 tractor and a considerable amount of other equipment were given to the Ambo Agricultural School. The other D-4 tractor and a similar amount of equipment were given to Jima Agricultural Technical School. Additional equipment was made available to institutions of general education and to a small number of private individuals. Schools and Government farms were given permanent possession of the machines, but private individuals were granted use of machines on a loan basis.

It is a credit to the thinking on the part of Ethiopian Government officials that a sizable proportion of the machinery was given to educational institutions. Most of this equipment is still being used to operate school farms and to train students.

In order that the best use could be made of machinery

and other supplies, the United Nations Relief and Rehabilitation Administration provided for limited training to accompany the distribution of supplies and equipment. Toward this end foreign-trained specialists were employed by the Administration. In the area of farm machinery this training was the responsibility of a small group of specialists most of whom served in Ethiopia for a period of less than two years. Recipients of equipment were given instruction in its assembly, operation, and use at the time it was given over to them. Follow-up instruction on adjustments and field repairs had been planned for regular and frequent intervals. However, due to the small number of personnel, the short period of time that the program was in effect, and the transportation problem, this was accomplished only in part. As a result, much of the equipment, other than that provided to educational institutions, soon fell into disuse.

Livestock

The United Nations Relief and Rehabilitation Administration oversaw the shipment of a large number of cattle to Ethiopia. The cattle which were shipped from the United States included the breeds of Angus, Hereford, Shorthorn, Brown Swiss, Ayrshire, Guernsey, Holstein, and Jersey.¹

¹Imperial Ethiopian College of Agriculture and Mechanical Arts. First annual report. Addis Abeba, Ethiopia. (Mimeo.) January, 1954.

Unfortunately, the shipment arrived in Jibuti in the summer of 1946. The combined effects of the trip, the torrid Jibuti heat, and disease contracted in Ethiopia caused the death of several bulls and many cows. Most of the survivors were transported to Shola Ber, a dairy farm near Addis Abeba, where they have been kept. Fairly pure herds of Holstein, Brown Swiss, and Ayrshire have been maintained. The other breeds were not successfully maintained.¹

The training program which was carried out in conjunction with the importation of livestock was principally of an on-the-job type. Veterinarians, dairy specialists, and an animal nutritionist attempted to train Ethiopians in production and management practices necessary to maintain beef and dairy herds. Much emphasis was placed on sanitation and disease control. Under supervision of the United Nations Relief and Rehabilitation Administration field service team, a pasteurizing unit was installed at Shola Ber.

Animal disease control

An animal disease control program was initiated by Administration veterinarians in July, 1946. One phase of the program had to do with the laboratory preparation of vaccines for use by members of teams who were trained in connection

¹William J. Beck. Addis Abeba, Ethiopia. Information concerning recent activities in extension in Ethiopia. (Private communication). April, 1957.

with the second phase of the program, the mass inoculation of cattle.

Seed improvement

A relatively small project was undertaken by the United Nations Relief and Rehabilitation Administration in the area of crop production. One agronomist with a small Ethiopian crew was assigned to test, in the limited time available, a number of seed varieties provided to Ethiopia. The testing of varieties amounted to planting small lots of seed and attempting to grow them to maturity.

Included in the seed shipment were small grains, oil crops, fiber crops, and vegetables. About 2 carloads of chemical fertilizer, about 4 tons of spray and dust chemicals, and a supply of crop spraying and dusting equipment were also made available. As was true in the case of farm machinery, the Ministry of Agriculture did not distribute all of these supplies immediately; many were still in storage at the time of writing. The educational effort in connection with crops appears to have been of relatively little significance because of the short period of time and the small number of personnel involved. The United Nations Relief and Rehabilitation Administration staff also included specialists in range management, irrigation and drainage, agricultural experiment stations, and forestry. Much of their work was of

an advisory nature principally within the Ministry of Agriculture.

Educational materials

Because a large proportion of the educated persons in Ethiopia had been eliminated during the Italian Occupation and because the country lacked educational facilities, a major effort was made to provide Ethiopia with agricultural training materials. Bulletins and technical books valued at Ethiopian \$112,500 (United States \$45,000) were provided to the country. The value of this material represented nearly 2 percent of the value of all such material procured by the United Nations Relief and Rehabilitation Administration. Ethiopia received a disproportionately large allotment of educational materials. Aside from the fact that books and other printed material were supplied to most schools, little information concerning the distribution or use that was made of this material was available.

The overall program of the United Nations Relief and Rehabilitation Administration met with limited success. There are several reasons for this. One reason was that the Administration operated in Ethiopia for less than 2 years. The work of technicians was scarcely begun when the program was dissolved. A second reason was that there were relatively few personnel engaged in the task of providing service and

training for many people. There were only 18 technicians employed during the peak period which was in September, 1946.¹ The staff remained at this strength for only a few months. It tapered off to about one-third that number in the closing months of 1947.

In spite of this limited achievement, the program of the United Nations Relief and Rehabilitation Administration must be given due credit for having laid the groundwork for technical assistance programs which were to follow. Although activities of the United Nations Relief and Rehabilitation Administration were essentially completed as of December 31, 1947, its funds and personnel were, in many instances, absorbed directly by one or more successor organizations such as the World Health Organization, the International Children's Emergency Fund, and the Food and Agriculture Organization of the United Nations. In Ethiopia, certain funds and the personnel of the Administration were absorbed by the latter agency. The technical assistance offered by the Food and Agricultural Organization will be discussed in the succeeding section.

¹United Nations Relief and Rehabilitation Administration, Report of the director general to the council for the period July 1, 1946, to September 30, 1946, p. 142.

United Nations Food and Agriculture Organization

The Food and Agriculture Organization was created in October, 1945, as a special agency of the United Nations. Membership consisted of 45 nations. Ethiopia did not become a member until 1947.

The broad objectives of the Organization as set forth in the Preamble of its Constitution¹ were (a) to help nations raise their standard of living, (b) to improve the level of nutrition for people in all countries, (c) to increase agricultural production, and (d) to better the conditions for rural people.

Toward the attainment of the foregoing objectives the Organization was given certain functions to perform. These include the following:

- (a) (to promote) the improvement of education and administration relating to nutrition, food, and agriculture, and the spread of public knowledge of nutritional and agricultural science and practice.¹
- (b) to furnish such technical assistance as governments may require.²

The emphasis on education and technical assistance was in contrast to the predominantly supply assistance program

¹United Nations Food and Agriculture Organization. Constitution, rules, and regulations. (Rome, Italy). March, 1954. p. 1.

²Ibid., p. 2.

carried out by the United Nations Relief and Rehabilitation Administration. With the creation of the Food and Agriculture Organization, there emerged a new type of assistance wherein technically advanced nations pledged to share their know-how with technically-unadvanced nations.

In February, 1947, an agreement was signed in the United Nations whereby the Food and Agriculture Organization would receive by transfer Ethiopian \$2,837,500 (United States \$1,135,000) from the United Nations Relief and Rehabilitation Administration which was scheduled for dissolution at the close of that year.¹ This fund, which came to be known as the Transfer Fund, supported the Food and Agriculture Organization during the initial period of its operation. After the Transfer Fund was utilized, the Food and Agriculture Organization was dependent upon the contributions of member governments. The failure of some governments to uphold their obligation in this respect has been the greatest weakness of the Food and Agriculture Organization.

In the agreement of February, 1947, provision was made for the transfer of personnel from the dissolved United Na-

¹Ralph W. Phillips, Truman F. Peebles, W. H. Cummings, and Lena Passerini. Food and Agriculture Organization advisory assistance to member countries under the United Nations Relief and Rehabilitation Administration--Transfer Fund. Food and Agriculture Organization Development Paper No. 24. Rome, Italy. February, 1953. pp. 1-2.

tions Relief and Rehabilitation Administration to the Food and Agriculture Organization. Thus, in many countries, even though there was a change in the administrative organization, there may have been only slight interruption in the assistance program.

The Ethiopian Government signed an agreement with the Food and Agriculture Organization in December, 1947; assistance commenced a few months later.¹ Under this agreement the Food and Agriculture Organization provided the services of a mission chief, or liaison officer, three veterinarians, two bacteriologists, and two cotton specialists.¹

Of necessity, the technical assistance provided to Ethiopia by the Food and Agriculture Organization has been primarily of an advisory nature. Within the scope of the Organization's budget and staff, only a limited amount of field work has been possible. Technical assistance has been offered by the Food and Agriculture Organization in many areas of agriculture, the more important of which will be discussed briefly. These include animal disease control, hides and skins, coffee, cotton production, seed improvement, reforestation, small agricultural implements, and fellowships for study abroad. Mention will be made of certain activities

¹E. S. Archibald. Beginning of the Food and Agriculture Organization in Ethiopia. Addis Abeba, Ethiopia. (Personal interview). September, 1955.

related to agriculture which are carried on by the Organization.

Animal disease control

The major effort of the Organization has been directed toward the control of the most serious livestock diseases in Ethiopia; namely, rinderpest, bovine pleuropneumonia, anthrax, and blackleg. In 1948 preliminary work was undertaken to test various rinderpest vaccines in order to determine whether an effective vaccine could be produced locally. In order for a vaccine to prove successful in Ethiopia, it should remain potent under conditions of minimum refrigeration. The mass production of vaccine was begun in a laboratory taken over from the United Nations Relief and Rehabilitation Administration. By 1951, sizable stocks of vaccines for all the four major diseases had been built up.¹ The bulk of this work was performed by Ethiopians who were trained by Organization technicians.

Mass inoculation against rinderpest was begun in 1949. During that year about 140,000 cattle were inoculated. The project grew rapidly and by mid-1954 a total of 2,579,532 cattle had been inoculated against rinderpest. Fifty-three

¹United Nations Food and Agriculture Organization. Report on activities of Food and Agriculture Organization under Expanded Technical Assistance Program. First financial period, 1950-1951, and outline of activities for 1952. Rome, Italy. May, 1952. pp. 1-4.

refrigerators had been distributed to provincial vaccination centers by 1954. During the same year, there were 282 Ethiopian personnel who had received training in field work and were serving on vaccinating teams.¹

Field teams found it necessary to "sell" vaccination to most livestock farmers in outlying areas because the farmers were often skeptical of its merit and, more important, many were unable or unwilling to pay Ethiopian 50 cents (United States 20 cents) per head for the inoculation. In this connection the Organization used its influence in securing the enactment of legislation to make the inoculation of all cattle against rinderpest obligatory. Inoculations were eventually made available to farmers free of cost as a result of joint effort by the Ethiopian Government and the United States technical assistance mission to Ethiopia.

Activities of the field teams were not confined solely to the control of rinderpest. During the period 1953 to 1954, 14,000 doses of bovine pleuropneumonia vaccine were utilized.¹

Hides and skins

Hides and skins are an important adjunct to the live-

¹United Nations Food and Agriculture Organization. Report on activities of Food and Agriculture Organization under Expanded Technical Assistance Program. 1953-1954. Rome, Italy. (Mimeo.) December, 1954. pp. 14-15.

stock industry in Ethiopia and have been given attention in the Food and Agriculture Organization program. Only one staff member was assigned to this project. His effort was limited to the outlining of a plan for improvement in flaying, handling, grading, and marketing. Among other things it was recommended that legislation be enacted to establish certain minimum standards of quality for hides and skins and that prices be adjusted to grades based upon quality. It was further recommended that a group of teams be organized to demonstrate proper methods of hide and skin removal and handling to people in livestock-raising communities.¹

Coffee improvement

The potential of Ethiopia's coffee industry has been only partially realized because of low production, poor handling and processing. The Food and Agriculture Organization initiated a project to study all phases of coffee production and to make recommendations for improvement. Throughout most of the period that the Organization has been in Ethiopia, one or more specialists have been assigned to this project. The team has cooperated closely with the Jima Agricultural Technical School in coffee research. Numerous importations of coffee and coffee seedlings have been made, and an extensive coffee research program has been set up at

¹Ibid.

the School.

Particularly noteworthy has been the work of Dr. Pierre G. Sylvain who has been responsible for much of the coffee study and research carried on in Ethiopia. He has outlined in considerable detail a plan for coffee improvement including selection, growing, handling, processing, and grading.¹

Through the efforts of Sylvain and others, there has been established the Imperial Coffee Board whose function it is to coordinate the industry in Ethiopia. The Board is composed of Government officials and members of the two leading technical assistance missions; namely, the Food and Agricultural Organization and the United States technical assistance mission to Ethiopia. Although the Board has focused attention on steps which could be taken to bring immediate improvement, its main function has been to work out a long-range plan for improvement. The latter has included legislation and a program of extension education in coffee production and management.²

Cotton production

¹Pierre G. Sylvain. Coffee. Report submitted to the Ministry of Agriculture. Addis Abeba, Ethiopia. (Unpublished typewritten rept.) (ca. 1954).

²Marcus J. Gordon. Coffee program in Ethiopia. Report at staff meeting of United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Oral). July, 1954.

Cotton was considered of sufficient importance that Ethiopian officials requested two cotton specialists in the original detachment of Food and Agriculture Organization personnel. A limited amount of improved cotton seed was supplied to Ethiopia and was distributed to farmers in various parts of the country. Up to the time of writing the Organization had not undertaken a breeding program in connection with cotton. The team has undertaken the collection of all available data concerning cotton in Ethiopia, including that acquired by the Italians. It has been strongly recommended by the team that an advisory board similar to that organized for coffee be set up for cotton.¹

Seed improvement

Another aspect of the Organization program has been the introduction of improved crop seed. Under the supervision of an agronomist this project was initiated in 1949. A total of 201 samples of seed were introduced during the 4-year period that followed. Information concerning the types of seed and number of samples by years is presented in Table 16. Portions of the samples were distributed to various government farms and to farmers. Plantings of most crops suited to

¹Technical Cooperation Service to Ethiopia. Monthly report of the Service. January 31, 1953. Addis Abeba, Ethiopia. (Mimeo.)

Table 16. Samples of seed made available in Ethiopia by the Food and Agriculture Organization^a

Crop	1949	1950	1951	1952	Total
Wheat	1		3		4
Barley			3		3
Oats	7		2		9
Maize	12			1	13
Millet	3				3
Sorghum	11				11
Forage grasses	6	3	2		11
Forage legumes	9	3	11		23
Soy beans	4		13		17
Sun flower	3		1	2	6
Castor beans			1		1
Peanut	3				3
Vegetables	7		30	5	42
Cotton	14		4		18
Hemp			1		1
Flax	3			1	4
Ramie		1			1
Tobacco				1	1
Tree seeds	27	3			30
Total	110	10	71	10	201

^aRalph W. Phillips, Truman F. Peebles, W. H. Cummings, and Lena Passerini. Food and Agriculture Organization advisory assistance to member countries under the United Nations Relief and Rehabilitation Administration--Transfer Fund. Food and Agriculture Organization Development Paper No. 24. Rome, Italy. February, 1953. pp. 28-33.

the Central Plateau were made at Holeta, a government farm near the Capital.¹

Reforestation

Activities of the Food and Agriculture Organization encompass the conservation and reforestation for forest areas. Ethiopia has only a limited amount of timber but that amount represents a major part of the usable timber in northeast Africa. Aware of the fact that much-needed forests in Ethiopia were being rapidly depleted, the Ethiopian Government requested that the Organization provide assistance. A forestry specialist began work in 1951.^{2,3}

An early recommendation was that a regulation be put into effect to protect forests from further depletion and that the Government take steps to establish a forest service. A regulation encompassing both suggestions was put into effect.⁴ Further recommendations were made for the establish-

¹United Nations Food and Agriculture Organization. Report on activities of Food and Agriculture Organization under Expanded Technical Assistance Program. First financial period. 1950-1951, and outline of activities for 1952, p. 31.

²Ibid., p. 32.

³United Nations Food and Agriculture Organization. Technical assistance in Ethiopia. (Rome, Italy. ca. 1955).

⁴United Nations Food and Agriculture Organization, Report on activities of Food and Agriculture Organization under Expanded Technical Assistance Program, 1953-1954, p. 16.

ment of forestry nurseries. Demonstrations were carried out in the use of modern forestry techniques. Seed introductions were made including 40 timber species which were tested on the Central Plateau and 60 species which were tested for possible use in dry areas.

Small tools

A small tools specialist joined the Food and Agriculture Organization staff in August, 1952, on a 1-year assignment.¹ Part of his time was devoted to a study of agricultural conditions in the country to determine (a) the types of tools used by farmers in various parts of the country, (b) possible improvement that could be made in native tools and implements, and (c) new tools and implements that could be purchased within the means of farmers. A second aspect of the project had to do with the distribution of tools and small implements provided for Ethiopia by the United Nations Relief and Rehabilitation Administration. Small turning plows were distributed to about 600 Ethiopian farmers in various sections of the Central Plateau.² These and other farmers were given instruction in the use of the turning plow and hand

¹United Nations Food and Agriculture Organization. Report to the Government of Ethiopia on small agricultural implements. No. 194. Food and Agriculture Organization. Rome, Italy. (Mimeo.) 1953.

²Ibid., p. 2.

tools.

Local merchants were interviewed in order to encourage them to import low-priced equipment suitable for use under Ethiopian conditions. Consideration was also given to the feasibility of having steel plows and hand tools fabricated locally. In this connection a light-weight steel pointed turning plow was designed and tested.¹

Fellowship program

In order to train Ethiopians to carry on the work begun by the Food and Agriculture Organization a "fellowship" program was organized. Under this program, outstanding young leaders are given an opportunity to go abroad for observation and study suited to the needs of their respective jobs. In most instances fellowships are made available to Ethiopians who have been employed by the Ministry of Agriculture and who have worked with Organization specialists. A fellowship may or may not involve college-level work leading toward a degree. Usually, the holders of fellowships have been sent to another country for observational study with a limited amount of course work being included. In all cases, an effort is made to acquaint holders with agriculture adaptable to conditions in Ethiopia.

As of July 31, 1955, a total of 27 fellowships had been

¹Ibid., p. 7.

awarded. Most were in the field of agriculture. The group sent abroad included two students who studied veterinary medicine, two who studied coffee, four who studied cotton, five who studied forestry, and two who studied home economics. It is anticipated that in time fellowships will be awarded in other areas of study.¹

Related projects

Related projects carried on by personnel of the Food and Agriculture Organization include advisory assistance to various sections of the Ministry of Agriculture. Assistance has been given in improving and expanding the agricultural statistics section of the Ministry. A survey has been made of water laws. Also, advisory assistance has been given in home economics education for girls. Advisory assistance to officials in the Ministry of Agriculture and to other governmental agencies has been a function of the Organization staff. It is noteworthy, in connection with the latter statement, that the first director of the Food and Agriculture Mission, E. S. Archibald, following his tour of duty with the mission, was hired by the Ethiopian Government at considerable expense to occupy a post as adviser to the Ministry of Agriculture.¹

¹United Nations, Food and Agriculture Organization, Technical assistance in Ethiopia.

An agricultural statistics section has functioned within the Ministry of Agriculture for many years; however, the data collected were often incomplete or inaccurate. A statistician was employed by the Food and Agriculture Organization to assist in the reorganization of the statistics section of the Ministry in an effort to bring about more adequate collection, analysis, and reporting of data.¹ The Organization has also secured the services of a water laws specialist who has begun a study of that facet of Ethiopian agriculture.²

Two home economists were affiliated with the Food and Agriculture Organization mission at the time of writing; and, although their work had not been directly related to agriculture, it bears special mention. The principal effort in connection with this project has been to provide instruction for the girls enrolled in home economics classes at the Empress Menen School. This has included instruction and practice in gardening, the preservation of garden vegetables, and the preservation of meat by canning and drying. In addition to this activity, the team has submitted plans to the Ministry of Education for the improvement and expansion of home economics education, particularly with respect to rural

¹Ibid.

²R. Innes. Activities of the Food and Agriculture Organization in Ethiopia. Addis Abeba, Ethiopia. (Personal interview). January, 1956.

communities.¹

The home economics team carried out an effective educational demonstration at the national exposition which was held at Addis Abeba during the month of November, 1955. A model tukul, or native house, was constructed and displayed. Included in the low cost, mud-plaster dwelling were a newly designed home-built stove, simple furniture, and serviceable facilities which could be acquired at low cost or made with hand tools. The display was viewed by thousands from both rural and city communities during the 26-day holding of the exposition.

The Food and Agriculture Organization has carried on agricultural education activities in Ethiopia with limited funds and with a small staff; most projects have been staffed with no more than one or two foreign-trained personnel. As a result a large part of the technical assistance has been of an advisory nature. It is unfortunate that, due to a limited operating budget, certain projects have had to be discontinued. Seed improvement and the small implements projects are two projects of particular note which were so affected. A fluctuating and unpredictable operating budget has perhaps been the greatest weakness of the Food and Agriculture

¹Thyra Andrean. Activities of the home economics section of the Food and Agriculture Organization in Ethiopia. Addis Abeba, Ethiopia. (Personal interview). September, 1955.

Organization assistance program.

In-service training activities involving demonstrations and projects have reached sizable groups of people. Academic instruction has been provided for relatively few; however, the training program involving fellowships is serving a very real need and should prove to be of considerable benefit to the overall improvement of agriculture.

United States Technical Assistance

Technical assistance offered under the sole auspices of the United States Government was proposed by President Truman in his inaugural address of January 20, 1949.¹ Excerpts from that address read as follows:

Fourth, we must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas.

Our aim should be to help the free peoples of the world, through their own efforts, to produce more food, more clothing, more materials for housing, and more mechanical power to lighten their burdens.

United States technical assistance became a reality through enabling legislation passed by the 81st Congress in June, 1950. From President Truman's proposal was derived the

¹Public Administration Clearing House. International technical assistance programs and organizations. Publication No. 108. Public Administration Service. Chicago, Illinois. 1952. p. ix.

term "Point Four" by which name technical assistance offered under the auspices of the United States Government has been generally known.

The original administrative organization which was set up to handle technical assistance was established within the State Department and was known as the Technical Cooperation Administration. This agency was subsequently dissolved, and a new one known as the Foreign Operations Administration was created outside of the State Department for the purpose of administering the program. On July 1, 1955, the administration of the program was returned to the State Department under the newly-created International Cooperation Administration. The latter agency is responsible for the program at this time, 1957.

The several major changes in the administration of technical assistance at the United States-Government level have not materially affected the nature of the program at the local level. In the case of Ethiopia the field program was administered by the Technical Cooperation Service to Ethiopia from the beginning until July 1, 1954. Thereafter the local agency was officially known as the United States Operations Mission to Ethiopia. Except where specifically stated to the contrary, the local administration will be referred to, in this study, as the United States technical assistance mission to Ethiopia.

A general agreement providing for the establishment of a mission in Ethiopia was signed by representatives of the governments of Ethiopia and the United States on June 16, 1951. In May of the following year Marcus J. Gordon, director, and a three-person staff arrived in Ethiopia to begin, in cooperation with Ethiopian officials, the task of planning a program of technical assistance specifically adapted to the needs of the country.¹

The operation of the program at the local level is designed to be a cooperative endeavor between personnel of the United States technical assistance mission and personnel of an appropriate agency of the Ethiopian Government. In order for a project to be initiated it must have been requested by the Ethiopian Government. Each of the several projects now in operation is under the administrative supervision of the co-directors, one of whom is the country director of the mission and the other, an Ethiopian official usually of the rank of minister, affiliated with the cooperating agency of the Ethiopian Government. The cooperating agency for most agricultural projects has been the Ministry of Agriculture. However, in the case of schools and colleges the Ministry of Education either has been, or is, the agency involved. The

¹Technical Cooperation Service to Ethiopia. Monthly report of the Mission. July 9, 1952. Addis Abeba, Ethiopia. (Mimeo.)

Ministry of Commerce and Industry has been the cooperating agency in the case of certain projects which are related to agriculture.

The cost of the program is shared jointly by the two governments. The Ethiopian Government is given credit for contributions in kind such as buildings, equipment, and other items which would otherwise have to be constructed or purchased for implementation of the project. Contributions from the two governments for any given project are placed in a separate joint fund in the State Bank of Ethiopia. Joint fund money may be paid out by the Bank only upon the receipt of a disbursement order signed by the co-directors, or their duly-authorized representatives. The contributions of the United States Government for the technical assistance program in Ethiopia from 1952 through 1957 has averaged Ethiopian \$6,166,750 (United States \$2,466,700) per year.^{1,2} Not all of the total amount was expended through joint fund accounts. A sizable portion has been utilized in support of a contract which has been effected between the United States Government and Oklahoma Agricultural and Mechanical Arts College. Under this contract the latter has undertaken the recruitment of

¹United States Operations Mission to Ethiopia. Program report of the Mission. December, 1955. Addis Abeba, Ethiopia. (Mimeo.) p. 7.

²William H. North. Information concerning cost of United States technical assistance program in Ethiopia. (Private communication). May, 1957.

personnel, primarily in the field of agriculture, for assignment with the mission in Ethiopia.

The main objective of the United States technical assistance program in Ethiopia has been the training of Ethiopians who may thereby be better prepared to assist in the country's social and economic advancement. In certain instances it has been more expedient to send students outside of Ethiopia for education than to attempt to provide the needed educational facilities within the country. However, the preponderance of effort has been devoted to the development of educational and training facilities within the country. Although technical assistance has been provided in many fields, for purposes of this study, only that in the field of agriculture will be considered.

There have been two principal types of projects offered in the field of agriculture. The first has had to do with the establishment of educational institutions. These will be discussed in a subsequent section. The second type of project has been that of providing services in connection with which on-the-job training has been offered. The majority of projects have been of this type although, in total cost and effort expended, this type is probably of less importance than that previously mentioned. The projects which have been primarily of a service nature in the field of agriculture include: plant protection and pest control, animal disease

control, the agricultural machinery pool, the agricultural improvement center, the cooperative coffee development, and the Central Experiment Station. In addition, brief mention will be made of the well drilling project and the rural vocational and industrial crafts project. Because the Central Experiment Station is operated by the Imperial Ethiopian College of Agriculture and Mechanical Arts, it will be described in a section dealing therewith. The various projects will be discussed individually.

Plant protection and pest control project

The basic agreement which provided for the establishment of the plant protection and pest control project was signed on November 5, 1952 by representatives of the United States technical assistance mission to Ethiopia and the Ministry of Agriculture. The purpose of the project, as stated in the agreement, was to provide assistance in the establishment of a pest control section in the Ministry of Agriculture with primary emphasis on locust control.¹

As set forth in the agreement, the United States Government has provided the services of one entomologist whose duty has been to supervise the project. In addition, the United States Government has agreed to provide in case of necessity,

¹United States Operations Mission to Ethiopia. Point 4 program in Ethiopia. A list of basic agreements. Addis Abeba, Ethiopia. (Mimeo.) September, 1954.

the use of three sprayer-equipped aircraft and chemicals for use against outbreaks of desert locusts.

The Ethiopian Government has supported one field assistant to the project supervisor and 10 trainees. In addition, it has provided vehicles, ground spraying equipment, and insecticides. In one of the few such instances of its kind, no contribution was made at the time the project was initiated by either government toward a joint fund for the operation of the project. Although a limited budget was approved in 1954, the activities of the project team have been restricted because of inadequate funds.¹

Notwithstanding this problem, many kinds of activities have been undertaken by the project team. Much time and effort have been devoted to the study of harmful insects and pests found in Ethiopia. These include desert locusts; malaria-bearing mosquitoes; various stem and leaf borers; soil insects such as wireworms, white grubs, ants, and armyworms; rats and mice; and wild animals such as wart hogs, and baboons. Much time and effort have been spent in testing various insecticides and pesticides.²

¹W. O. Ridgway. Desert locust control in Ethiopia. Report presented at staff meeting of United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Oral). December, 1954.

²Imperial Ethiopian College of Agriculture and Mechanical Arts. Second annual report. Addis Abeba, Ethiopia. (Mimeo.) January, 1955. pp. 85-91.

The most concerted effort has been expended in connection with desert locust. Undoubtedly, more damage is done in Ethiopia annually by these insects than is done by all other forms of insects and pests combined. The seriousness of the problem stems from the fact that there are three locust breeding seasons in Ethiopia; whereas, no other country in the world is known to have more than two seasons, and most have only one.¹ Furthermore, because Ethiopia is mountainous and has a favorable rainfall, its green crops attract locusts from surrounding areas nearly all of which are relatively hot and dry.

In cooperation with other locust control teams which have been maintained solely at the expense of the Ethiopian Government, the team has maintained records concerning the location of egg fields and the local infestations of locusts in Ethiopia. These data are relayed to the Middle East Locust Control Headquarters where an effort is made to predict locust outbreaks and migration patterns for the entire Middle East region.

Because of very limited funds, the project team has done very little actual locust baiting. Most of this has been done by baiting teams maintained by the Ethiopian Government. However, the latter have been assisted by the project team.

¹Ridgway, op. cit.

In cases of heavy infestation, the project team has called upon aerial equipment dispatched from Middle East Locust Control Headquarters.

The training effort carried on in connection with the project has been of an in-service nature. Four trainees were assigned to the project in 1953; the number was increased to nine in 1954. The trainees have participated in all field activities of the project team. In connection with all activities, the project supervisor has given on-the-job instruction not only to trainees but to many other Ethiopians assigned to government baiting teams. Such instruction has been provided through demonstrations and small-group lectures. The latter were frequently conducted in the project field headquarters at Dire Dewa or in field tents on the desert. Because it is necessary that every project supervisor train one or more persons who can eventually assume responsibility for the project, the supervisor spent a considerable amount of time individually instructing the field assistant.

The project supervisor also undertook other responsibilities. One such activity consisted of providing instruction in the basic phases of entomology for rural teachers at their in-service education meetings conducted during the rainy season at which time schools are not in session. Another activity has been that of writing instructional materials for

use in schools and in meetings conducted by extension workers. Most of this material has been written in simple language and has been well illustrated with drawings. The ideas described in the several pamphlets written by the project supervisor were, in most instances, totally new to Ethiopians; however, because they were described in an appealing manner, the pamphlets appeared to be very well received. Another responsibility of the project supervisor, as has been true of all other project supervisors, has been that of providing advisory assistance to Ministry and Government officials when such has been requested.

Animal disease control

The original agreement which provided for the establishment of the animal disease control project was signed on June 30, 1953. The purpose of the project has been to assist in an overall program of disease control among livestock. This program had been instituted previously as a cooperative effort supported by the Ethiopian Government and the Food and Agriculture Organization of the United Nations. The cooperating Ethiopian agency was the Ministry of Agriculture.

Contributions toward a joint fund included Ethiopian \$312,500 (United States \$125,000) from the Ethiopian Govern-

¹United States Operations Mission to Ethiopia, op. cit., pp. 12-13.

ment and Ethiopian \$187,500 (United States \$75,000) from the United States Government. The latter also provided the services of two veterinarians. The former provided vehicles, laboratory facilities, refrigerators, and other equipment.

This project involved the services of a relatively large number of local personnel. Provision was made in the original agreement for an administrative and laboratory staff of 60 and a field staff of 232. It should be pointed out that this was a cooperative effort and that, in essence, the assistance offered by the United States mission was pooled with that of other agencies which were already engaged in disease control work. Therefore, part of the local personnel consisted of persons already engaged in animal disease control effort supported jointly by the Ethiopian Government and the Food and Agriculture Organization.¹

The veterinarians recruited by the United States technical assistance mission arrived in Ethiopia in June, 1954. During the first several months, numerous familiarization trips were made throughout Ethiopia. This travel provided an opportunity for an inspection of vaccination centers already in operation. It also provided an opportunity to learn something of the disease problems among Ethiopian livestock,

¹This topic was briefly considered in the section dealing with the activities of the Food and Agriculture Organization.

a very brief description of which has been given elsewhere in this study.

Within a few months after the project team arrived in Ethiopia the number of vaccination teams was increased considerably over the number which had been in service. Where feasible, the techniques in producing, transporting, and administering vaccines were improved in order to accelerate the program. Due to these changes and to the fact that vaccination could be provided free of charge as a result of governmental legislative action taken in May, 1954, the number of vaccinations was greatly increased. Whereas an average of only 644,883 head per year had been vaccinated during the 4-year period ending in December, 1954, during the following year about 1,737,010 head were vaccinated against rinderpest.^{1,2}

Although most of the effort of the animal-disease-control team was directed toward the control of rinderpest, some attention was given to tick-borne diseases, to hoof-and-mouth disease, and to contagious bovine pleuropneumonia. The latter two diseases hinder the export of beef. A vaccine is available for use against pleuropneumonia, but it is

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 81.

²Imperial Ethiopian College of Agriculture and Mechanical Arts. Third annual report. Addis Abeba, Ethiopia. (Mimeo.) January, 1956.

effective for only a year or less.¹

The principal training effort carried out by the animal-disease-control team concerned the demonstration of vaccination techniques to the more than 200 vaccinators who were assigned to the many teams stationed throughout Ethiopia. The language barrier and the lack of education among vaccinators greatly restricted the amount of instruction that could be given. Laboratory workers and a few leaders of vaccination teams who had had some education were given such individual instruction as could help them do a better job.

The need for education among farmers and cattle owners has been discovered by members of the animal disease control group who, in some instances, found cattle owners unwilling to have their animals vaccinated. Some owners expressed a fear that the vaccination team was there only to count the cattle for the Government which could then assess additional taxes. Others thought that the vaccine would kill their animals. Leaflets explaining the program were distributed in areas where the greatest resistance was met. In most instances this practice has helped in overcoming resistance.

Agricultural machinery pool

On June 10, 1954, an agreement was signed by representatives of the host government and the United States technical

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Second annual report, p. 82.

assistance mission which provided for the establishment of an agricultural machinery pool.¹ The purpose of the project, as stated in the agreement, was to put to use the machinery and tools held by the Ministry of Agriculture and to train Ethiopians in the repair, maintenance, and operation of agricultural tools and machinery.

Under this agreement, the United States Government provided the services of a project supervisor and contributed Ethiopian \$125,000 (United States \$50,000) to a project joint fund. The host Government made no contributions to the joint fund but did make contributions in kind which consisted of farm machinery, spare parts, tools, buildings, and land.

After some deliberation, it was agreed that the machinery pool should be established at a storage center near the Capital. In this center had been stored much of the unused machinery supplied by the United Nations Relief and Rehabilitation Administration along with a considerable amount of other machinery and equipment held by the Ministry of Agriculture.

During the first 6-month period an accurate inventory² was prepared of all machines, tools, and spare parts held in

¹United States Operations Mission to Ethiopia, op. cit., p. 7.

²Cooperative Agricultural Machinery Pool. First annual report. Addis Abeba, Ethiopia. (Unpublished typewritten rept.) January, 1955.

this and other storage centers near the Capital. Insofar as the availability of storage space permitted, an effort was made to store machines and parts to prevent further rusting, cannibalizing, and deterioration. A contract was let for the construction of two storage sheds and for the renovation of an existing building which was needed for a shop.

From more than 100 young men who, during the last 4 months of 1954, requested training in the Machinery Pool, 15 were selected and employed on a temporary basis. It was intended that the most capable applicants would be accepted on a permanent status beginning January 1, 1955, when the trainee program could be gotten underway.¹ At the close of the year, four members of the group dropped and 11 were enrolled as trainees. This was nearly twice the number prescribed in the project agreement. However, due to the fact that there was a great need for young men trained along the lines proposed and because of the possibility that some might drop out, it was decided that additional trainees who showed aptitude for the type of training being offered should be enrolled. All of those selected could speak English well and could write it reasonably well. Each was paid a stipend during the period of training.

¹Cooperative Agricultural Machinery Pool. Second annual report. Addis Abeba, Ethiopia. (Unpublished typewritten rept.) February, 1956.

On January 2, 1955, organized instruction was begun for the trainee group which met at the beginning of each day for this purpose.¹ As set down in the original plan for the trainee program, instruction was scheduled for one hour each day. However, in practice, the instruction period was often extended to two hours or longer. The area of instruction was new to about half of the trainees. Two were graduates of a technical secondary school and certain others had had schooling or experience or both along related lines. Copies of five reference books were purchased for use during the first two years of the instructional program. Four were in the area of farm mechanics. One was in the area of engines and tractors.

During the first 4-month period, instruction and demonstrations were centered around basic farm mechanics skills. Where possible, the individual instruction periods were arranged to fit repair or construction projects underway in the pool. Of course, this could be achieved only within limits. Although the machinery pool was primarily a training center, it was secondarily a service center. Because of this it was, from the beginning, deluged with requests for all manner of service. Some requests were of such nature that they required attention irrespective of their relevance to

¹Ibid.

the training program.

During the next 6-month period, instruction and demonstrations were centered around welding, the use of simple power tools, and the repair and operation of simple agricultural machines. Appropriate repair and construction jobs were undertaken. Only a limited amount of engine and tractor repair was undertaken during this period. This was deemed advisable because there is, in Ethiopia, farm machinery from nearly every manufacturing country in the world. Unless trainees could be given a fairly sound understanding of the fundamentals underlying the makeup and operation of agricultural machines, they could scarcely be expected to master the multiplicity of machines and types of machines with which they would be working.

Beginning in November, 1955, instruction was turned to the study of gasoline engines followed by diesel engines. Diesel power constitutes the principal source of automotive power in Ethiopia and is becoming increasingly important with the passage of time.

During this period a shift was made in the nature of the instructional program. As more difficult jobs came within the abilities of the trainees it was necessary to consider, individually, problems connected with particular machines. Toward this goal, the instruction was put on an integrated basis to allow greater flexibility in adjusting instruction

to repair or construction jobs.

At the request of the Ministry of Agriculture, the supervisor and trainees undertook the erection of an educational display at the national exposition, an agricultural and industrial fair held once every four years in the Capital. The exposition was held from November 5 through November 30, 1955.

The display was an outdoor one which occupied a space approximately 14 meters by 40 meters (about 46 feet by 131 feet). This area was divided lengthwise into two plots approximately equal in size. In one plot was placed the machines which would be necessary for a mechanized farming operation for the production of cereal crops in Ethiopia. One large tractor was stationed with a plow breaking the land. A second tractor was hitched to seedbed-preparation implements and was stationed on the plowed land as would be necessary for the preparation of the seedbed. A third tractor was stationed with attached seeder on the firmed seedbed as would be the case if seed were then being planted. Behind the seeder, matching the seeder openers, were rows of wheat which had been planted about 1 month prior to the opening of the exposition. On the opening date the seeding stood about 4 inches high and added a note of realism to the display.

In the other plot, improved ox-drawn equipment which could be used to perform essentially the same operations, but

on a much smaller scale, was realistically displayed. Life-sized silhouettes of oxen, which were cut from wood, were used to represent draft animals. Two yoke of oxen were hitched in tandem to a steel turning plow and were appropriately stationed. A third yoke of oxen was displayed drawing an improved handmade implement recommended for the preparation of a seed bed. A fourth yoke was displayed drawing a one-row planter behind which was shown several rows of growing corn.

Panels bearing printing in both English and Amharic were placed at the various implements explaining pertinent topics such as the need for clearing stones from the land, the necessity of having available sufficient traction force to properly turn the plow layer, the need for adequate seedbed preparation, and the need for planting many crops in rows. In addition, particular care was taken to explain that all of the implements displayed behind oxen could be obtained locally at very reasonable cost. To answer additional questions one trainee was on duty each day throughout the 26-day period that the exposition was held.

It was evident from the number of people who observed the display and the questions asked of the trainee on duty that there was considerable interest in both ox-drawn and tractor-drawn agricultural machines. Apparently rural people derived some educational benefit from the display.

Educational activities were also carried on in connection with other service projects of the United States technical assistance mission and with service agencies of the Ethiopian Government. There were several proposed educational and service activities described in the original project agreement that were given little or no attention. One such proposed activity was that extension work be carried out in the use of farm machinery. Neither staff nor time permitted attention to this need.

By and large the trainee program has progressed very successfully. Boys who at the beginning knew very little about hand tools had progressed in 18 months to the place where they could handle most of the repair work on gasoline engines and similar jobs on diesel engines with very limited supervision. Also, they have been given instruction in the repair and operation of most types of agricultural machines.

Agricultural improvement center

Through an agreement signed by representatives of the Ethiopian and United States governments on June 10, 1954, provision was made for the establishment of an agricultural improvement center in the Kobo-Alamata area in northcentral Ethiopia. The purpose of the project, as stated in the agreement, was to carry on educational and demonstrational work with farmers in the area to bring about improvement in agri-

cultural practices.¹ Emphasis was to be placed upon seed improvement, improved cultivation, soil conservation, and insect control, particularly with respect to cotton production.

Under the agreement, the United States Government has provided the services of one agronomist and, also, has contributed Ethiopian \$125,000 (United States \$50,000) toward a joint fund for the project. The Ethiopian Government made contributions in kind which consisted of farm machinery, land, and buildings.

The decision was made for the improvement center to be established near the town of Alamata located on the Kobo-Alamata Plain in southern Tigre Province and central Welo Province. The plain, estimated to contain more than 140,000 hectares (345,800 acres) is well suited to the growing of cotton. However, at the time the agreement was signed, the area did not produce enough cotton to meet the needs of the local people.² Through the courtesy of the Ethiopian Government, the local governor, and the neighborhood farmers, more than 1 gasha (about 100 acres) of fertile land was made available to the center. Because the arrangement was made

¹United States Operations Mission to Ethiopia, op. cit., pp. 5-6.

²The general conditions surrounding cotton production have been discussed in an earlier section dealing with native agriculture.

late in 1954, there was no possibility for clearing the land and planting a crop for the 1954 season. In preparation for the 1955 growing season, coolies were hired and assigned the task of clearing the land of stumps and brush. Scattered, small fields previously tilled by farmers had been cleared already.

During July and August of 1955, about 26 hectares (64.2 acres) were planted to cotton. Eight varieties were used in the seeding. Most of them had been obtained from the United States. All varieties made very rapid early growth; however, fusarium wilt damaged about 80 percent of the plants and seriously reduced the yield. No variety escaped damage. In those isolated places where wilt did not damage plants, the yield was described as excellent.

In 1955, a small cotton cleaner and a 40-saw gin were installed in buildings which had been constructed by an Italian firm, Compagnia per il Cotone di Ethiopia, in the town of Alamata. The small-capacity equipment has been used only to process the cotton produced on the improvement center farm. No immediate plans have been made to clean and gin cotton grown by Ethiopians although the original project agreement carried a provision that such a service eventually would be made available to the people of the area.

At the time of writing, the improvement center has been

in operation for two seasons. Of necessity much of the total effort has been devoted to getting the land into production. Prior to the achievement of these goals only limited attention could be given to the educational program planned in connection with the project.

One activity carried on has been the distribution of seed to farmers. If the production of cotton is to be increased, it is apparent that farmers should plant seed from improved varieties in place of the perennial-type cotton now grown. Toward this end, the project supervisor with the help of extension workers from the Imperial Ethiopian College of Agriculture and Mechanical Arts visited all the surrounding communities. They sought out the most outstanding and influential farmers. These farmers were invited to the Improvement Center where demonstrations of seedbed preparation and planting were given. Each farmer was given enough improved cotton seed to plant 1 hectare (about 2.5 acres) of land. This activity was carried on in 1954 which was a year when locust damage was severe. Nearly all of the cotton was destroyed as were most crops on the plain. In the one or two instances where farmers were able to guard their fields, the cotton grown from improved seed produced a fair yield, much above the native type. Farmers appeared very appreciative of the service.

During their vacation season, students from the Jima Agricultural Technical School who are interested in cotton production have visited the improvement center. In 1954, nine students visited the center. In 1955, three took part in the activity. The students were given instruction in cotton production methods, cleaning and ginning, and soil conservation practices applicable to cotton producing areas.

The most important educational activity carried on at the improvement center has been the in-service training of four trainees who have spent their full time at the center. They have received instruction and considerable first-hand experience in the clearing of land, the operation of tractors and mechanized equipment used in cotton production, the cultivation of the growing crop, the spraying of cotton, and the processing of cotton including cleaning and ginning. The boys have shown a great deal of interest in cotton production and have advanced well along the way to where they can assume responsibilities for operating similar centers which have been planned for establishment elsewhere in Ethiopia.

Cooperative coffee development project

Toward the attainment of much-needed improvement in the coffee industry of Ethiopia, representatives of the Ethiopian Government and the United States Government signed an agreement on June 29, 1954, which provided for the establishment

of a cooperative coffee development project.¹ Specifically, the purpose of the project, as stated in the agreement, was to conduct an educational and demonstrational program to improve the quantity and quality of Ethiopian coffee through improved methods of producing, processing, and marketing. It is generally accepted that a large percentage of the Ethiopian coffee has a natural flavor equal in quality to the best coffees produced anywhere. However, it is also recognized that Ethiopian coffee reaches the market in very poor condition.

Under the project agreement, the United States Government provided the services of a project manager, a marketing specialist, and a production specialist. In addition a sum of Ethiopian \$200,000 (United States \$80,000) was contributed to a joint fund for the project. The host Government agreed to make certain contributions in kind, not described in the agreement, and contributed Ethiopian \$250,000 (United States \$100,000) to the joint fund.² Provision was made for the hiring of a number of Ethiopian personnel for the carrying out of various activities outlined in the agreement. The need for organizing the project as a cooperative effort stemmed from the fact that a number of agencies including the

¹United States Operations Mission to Ethiopia, op. cit., pp. 10-11.

²Ibid.

Ethiopian Government and the Food and Agriculture Organization, are engaged in a similar effort. As was pointed out in an earlier section, the overall coffee program in Ethiopia is guided by the National Coffee Board. In order that an effective approach could be made toward the improvement of coffee production, marketing, and processing, field surveys were made to determine which areas in the country should be given early attention. Recommendations were set down as to how the project objectives could best be attained.

Although educational activities proposed for the project were not begun for nearly two years after the signing, work was begun in 1954 on the growing of coffee seedlings for distribution to farmers. This work was greatly assisted by the coffee research program then underway at the Jima Agricultural Technical School. At the Jima Branch Experiment Station operated in connection with the School, a large coffee nursery was begun, and by the close of 1955 a total of 120,000 seedlings had been produced. Two additional nurseries were established elsewhere in the same province. These two contained 41,000 seedlings. Altogether a total of 161,000 seedlings had been produced by the close of 1955. With a sizable number of coffee seedlings available for distribution to coffee growers, attention was given to details of the program through which the distribution would be carried out. Because this program was only in the planning

stage at the time of writing, description of the program will deal with the proposed plan of organization.

The educational program as proposed would be of two phases. One phase would have to do with the distribution of seedlings to farmers. Demonstrations including improved methods of producing, processing, and handling coffee would be given to the farmers. The second phase of the educational program provided through the project would have to do with the training of Ethiopians who could eventually assume responsibility for the project.

The plan by which new techniques would be demonstrated to farmers was simple. It was proposed that a sizable number of capable young Ethiopians, possibly as many as 150, be recruited to form 50 demonstration teams. The teams working individually would go to the villages and demonstrate improved practices in coffee production, processing, and handling.

Particular emphasis would be given to the picking and drying of the coffee cherries. As was explained in an earlier section, the quality of Ethiopian coffee is sometimes very low because unripened cherries from the tree and overripened cherries from the ground are included in the harvest. The cherries are usually dried on the ground or on skins either one of which imparts an undesirable flavor to the coffee. In each village the team would be expected to demonstrate

the various operations including transplanting, pruning, and the construction of a drying rack of stone or wood. As proposed the demonstration would include transplanting, pruning, mulching, shading, cultivating, processing for market, storing, and handling.

Before the teams would be sent out, the members would be given up to 6 months instruction in the previously-listed practices. There would be specialization of members within each team. One member might concern himself with the production of coffee while the second might concern himself with processing. The third might be responsible for giving instruction in the recommended practices in handling coffee.

The training of Ethiopians to take over the project will be largely taken care of by the Jima Agricultural Technical School. Students who, at the time of writing, have completed their second year of college-level schooling there have received research experience in most phases of coffee production and processing. No better-qualified young men can presently be obtained in Ethiopia. If a number of these students will interest themselves in the Cooperative Coffee Development project and acquire several years of experience they should be fully qualified to assume responsibilities of the project.

Well drilling project

Unlike most other projects related to agriculture, this

project has not been co-sponsored by the Ministry of Agriculture. Rather, the agreement was signed on June 30, 1953, by representatives of the Ministry of Commerce and Industry and the United States technical assistance mission. The purpose of the project was to develop a program of training and demonstration in well drilling to ensure a safe and adequate supply of water for people and livestock.¹

A contribution of Ethiopian \$316,215 (United States \$126,486) was made initially by each of the two governments toward a joint fund. In addition, the United States Government provided the services of a two-man supervisory staff. Under the agreement, four well drillers and 19 trainees were to have been recruited locally. However, trained personnel could not be secured locally. Eventually, these were recruited in the United States. In addition to the aforementioned, the Ethiopian Government made certain contributions in kind. The project activities were considerably expanded in subsequent years; contributions made by both governments were also increased.

A large part of project funds was expended for the purchase of well-drilling equipment. By August, 1954, three drills were either in operation in Ethiopia or were in ship-

¹Ibid., p. 17.

ment to the country.¹ Provision was made for the purchase of additional drills as funds became available.

Although, initially, a number of wells were drilled at sites where United States technical assistance work was underway, the long range plan was to devote the principal effort to drilling wells for rural communities. The cost of drilling all such wells in the provinces was to be borne in part by either the local or provincial government. In this way, more communities could avail themselves of the service and there might be considerably more incentive for providing proper care of the well, the windmill-operated pump, and water storage tanks installed at each location.

The training program offered through this project was not directly related to agriculture. It consisted almost wholly of on-the-job training in the numerous jobs associated with the operation of well-drilling equipment. Most of the young Ethiopians employed on the drills were alert and capable. Some had had previous experience as equipment operators. At least two or three boys on each crew could speak English.

Rural vocational and industrial crafts project

This project was established through an initial

¹United States Operations Mission to Ethiopia. Point 4 news. Progress report of the Mission. No. 19. August, 1954. Addis Abeba, Ethiopia. (Mimeo.)

cooperative agreement signed by the representatives of the Ethiopian and United States governments on June 12, 1954. The purpose of the project, as stated in the agreement, was the establishment of handicraft centers throughout the provinces with the view of developing home industries by the teaching and promotion of native crafts.¹

Under the agreement the United States Government provided the services of a project director and a handicraft supervisor. A contribution of Ethiopian \$25,000 (United States \$10,000) was made by each government toward a joint fund. In addition, the Ethiopian Government made certain contributions in kind as were needed to facilitate the establishment of handicraft centers. Although the project is not administered under the agricultural program, the activities proposed for the project do have a direct bearing on agriculture in rural areas.

Through this project provision is made for the establishment of training centers wherein villagers could learn vocational and industrial skills including leather working, rug making, basket making, blacksmithing, and furniture making. It was intended that an individual who has attended the handicraft center and has learned a particular craft should, if possible, continue that craft in his own home.

¹United States Operations Mission to Ethiopia. Point 4 Program in Ethiopia. A list of basic agreements. p. 32.

The center will provide the individual with some assistance in making or acquiring the basic tools and equipment needed in the particular activity which he wishes to undertake. As planned the center will also assist initially in selling the product of the home industry.

Rug making will be given considerable emphasis. Because Ethiopian sheep do not produce wool it has been necessary to introduce wool sheep into the communities where handicraft centers have been established. In this connection, some instruction in basic agriculture will be provided at the center.

There are other aspects of the program which will touch upon agriculture. Some of the basic skills taught at the center will be useful to the farmer. Blacksmithing is an example. It will provide the farmer with a means of shaping the points for his plow and hoe. Home industries, when developed, will provide a market for some agricultural products such as wool, leather, and cotton.

According to plan only persons who are 18 years of age or older will be accepted for training. In this way there should be no competition between a handicraft center and a school, should one of each be established in the same community. The number of trainees who will be accepted in the center will depend upon available facilities and the staff.

Teachers who have had special training in the various

crafts will be recruited. It is not expected that the drain upon the normal supply of such teachers will be heavy. A relatively small number of centers will be established each year. As of January, 1955, one handicraft center had been established at Asela in Arusi Province and a second center was being organized in Addis Abeba. Plans were underway for the establishment of centers at Buta Jira in Shewa Province, Dese in Welo Province, and Dembi Dolo in Welega Province.

AGRICULTURAL EDUCATION PROGRAMS IN SCHOOLS AND COLLEGES

During the 15-year period since the 1941 Restoration, there has been a rapid expansion of agricultural education in schools and colleges in Ethiopia. A small part of this training has been made available in or is planned for schools of general education. A much larger part of the total offering has been through agricultural schools and colleges. The ensuing discussion will relate to agricultural education in schools and colleges including community schools, the Harer Teacher Training School, the Ambo Agricultural School, the Jima Agricultural Technical School, and the Imperial Ethiopian College of Agriculture and Mechanical Arts.

Community Schools

One of the most progressive steps in the advancement of agricultural education in Ethiopia has been the proposal for the establishment of community schools for basic education. This program, which is presently progressing from the planning stage to the implementation stage, has been described in the section of the study dealing with general and technical education. An additional statement is appropriate at this point.

According to plan, an important part of the instruction

to be offered in community schools will be in the area of agriculture. Although full details have not been worked out regarding the exact nature and content of the instruction that will be offered, it is expected that the instruction will include the fundamentals of crop and livestock production and improvement, the irrigation of crops, the preparation of agricultural products for market with reference to maintaining quality; the preservation of food products, the storage of agricultural produce, and the construction of various types of shelters.

The community school as proposed will provide educational experience for a great many Ethiopians who would otherwise probably have no such opportunity.¹ According to plan, each community school should provide some training in agriculture for about 500 rural people during the first 10 years of operation. If 35 or more of these schools are established each year, it is evident that within a few decades the number of people reached will constitute a sizable proportion of the population. This statement is made on the assumption that each school will offer only 4 years of instruction, that each class will be filled to a maximum of 40 students, and that

¹Gabre-Tsadik, Belleteu and W. L. Wrinkle. The controlled expansion of Ethiopian education. A special report to the Long-Term Planning Committee of the Ethiopian-United States Cooperative Education Program. Part IV. March, 1955. Addis Abeba, Ethiopia. (Mimeo.) pp. 14-15.

each community leader will be responsible for the out-of-classroom instruction for about 100 farmers.

The community school should provide, at relatively low cost to the Government, a working contact with rural people and should serve as a center at the community level for the dissemination of new ideas originating in educational institutions, in government research centers, and within the Government itself, particularly within the Ministries of Agriculture, Public Health, and Commerce and Industry. The community school should be a valuable asset to agricultural extension in Ethiopia. When extension is organized on a large scale, workers can move into communities which have established schools and expect a great deal of the groundwork to have already been laid by the community school leader. This should hasten the spread of agricultural extension.

The community school should provide agricultural leaders with information which will be useful in the establishment of schools at other levels. Specifically, such information will include the attitude of rural people toward agricultural education and their willingness to support it through taxation, the recruiting and training of teachers, the number of students that can be successfully given instruction by a classroom teacher, the number of adult farmers that should be assigned to one out-of-classroom teacher, and the facilities and equipment needed in the operation of such a school.

Harer Teacher Training School

In 1954 an agricultural education section was established in the Harer Teacher Training School.¹ The intended functions of the new section were (a) to provide basic instruction in the elements of modern agriculture to prospective teachers and (b) to carry on limited agricultural extension activities with farmers in the vicinity of the School.

To carry on this program of instruction and extension, the services of one agriculturalist were made available through the United States technical assistance mission. Classes taught by the instructor were attended by 125 student teachers during the 1954-1955 school year. During the following school year, 147 student teachers received similar instruction. Since that date, the number receiving instruction in agriculture has closely paralleled the steady increase in total enrollment at the school.

The instruction was organized to meet two basic needs of the student teachers. One was the need for factual information concerning improved agriculture. The other was the need for an understanding of techniques and methods that could be used in effective teaching.

Of necessity, only the very basic aspects of agriculture

¹A description of the basic program of teacher education at the Harer Teacher Training School was presented in an earlier section of the study which dealt with general and technical education.

could be presented in this type of instructional program because the students' principal concern would be general education, not agricultural education. Included in the instructional program has been elements of soil conservation, crop improvement, horticulture, and livestock care. The instruction in agriculture is given during the first three years of the 4-year course of instruction at the teacher education school.¹

In addition to classroom instruction students are given an opportunity to grow crops and thus learn from experience. During the 1954-1955 school year 67 different varieties of field and vegetable crops were grown on school-owned plots.² Students have been permitted the use of individual plots, also, where they have raised small gardens in order to gain further experience and to produce a small amount of vegetables for home use.

A survey was made of the members of the 1955 graduating class who were teaching in widely situated parts of the country. More than half of the class had been interviewed or had been reached through correspondence. With few exceptions, those who had been contacted were carrying on improved

¹Imperial Ethiopian Government. Ministry of Education. Yearbook. 1951-1953. Addis Abeba, Ethiopia. 1954. pp. 52-54.

²Imperial Ethiopian College of Agriculture and Mechanical Arts. Third annual report. Addis Abeba, Ethiopia. (Mimeo.) January, 1956. p. 85.

projects in a manner very similar to that which had been demonstrated to them at the Teacher Training School. Nearly all of the graduates who were reached requested additional information about poultry, garden seeds, and various other phases of agriculture.¹

The students have been given instruction in various teaching methods including demonstrations, field trips, supervised study, and the use of illustrative materials such as pictures, charts, and drawings. As teachers, probably very few of the individuals will be assigned where electricity is available. Therefore, little instruction is given in the use of filmstrips and other similarly valuable teaching aids which operate on electricity. Because agriculture lends itself very well to demonstration techniques, the lack of electricity and classroom facilities may be less of a problem in teaching classes in agriculture than in teaching other classes.

Only a part of the instructor's time has been spent in the preparation of teachers. During 1955, a total of 57 local farmers were given assistance through the School's extension program. Many farmers wanted and were given help in securing improved seed. Others requested the use of one or other pieces of machinery owned by the school. Still

¹Ibid.

others were given assistance with livestock problems.

An agreement was worked out with a leading farmer whereby a certain amount of land could be utilized to grow varieties of corn and sorghum. A total of 16 imported varieties were supplied for testing by the School. To emphasize the potential increase in yield possible when both improved seed and improved methods are used, the farmer was asked to plant corn and sorghum, in the traditional way. This consisted of broadcasting the seed and covering it by tilling the soil with the native plow. On the same day with the same implement, student teachers planted samples of improved seed from the 16 varieties. All varieties were planted in rows. The rows were sufficiently straight that the crop could be cultivated without dislodging more than a small percentage of plants. The farmer cultivated his crop in the usual manner which includes the transplanting of dislodged plants into the newly formed rows. Although no scientific evaluation was made of the results, most of the introduced varieties out-yielded the local selection. One or two varieties yielded exceedingly well and appeared, on the basis of a single year's performance, to be of some promise in that area.

Ambo Agricultural School

At the time of writing there is one educational institution supported solely by the Ethiopian Government that is

engaged in agricultural education to the exclusion of other offerings. This is the Ambo Agricultural School located in Guder Subprovince of Shewa Province.

A school was originally opened at this site in 1946 by the Ministry of Agriculture. In connection with the school there was planned an agricultural improvement center, or experiment station.¹ Because the school was inadequately staffed and was poorly organized, it was only partially successful. In 1947 the school was transferred to the Ministry of Education under the direction of which it was to have become Ethiopia's agricultural college. Again the school administration met with a problem of acquiring a qualified staff and sufficient financial support to properly equip an agricultural school. As a result, little was accomplished toward the establishment of an agricultural college. Re-transfer to the Ministry of Agriculture was effected at the end of 1948.¹

The school was operated for three years by a staff made up partially of foreign teachers and partially of local teachers. During this period the school was organized on the basis of a secondary school. Most of the students came from among those who had previously attended the school.

The schedule of courses prescribed for students during

¹Imperial Ethiopian Government. Ministry of Education. Yearbook. 1947-1949. Addis Abeba, Ethiopia. 1950. pp. 68-69.

that period included mathematics; Amharic; English; science, including chemistry, physics, botany, and zoology; general agriculture, including field and animal husbandry; farm economics, motor mechanics; and physical education.¹ As a part of their training and to help produce the school's food supply, students were required to devote a part of their time to the care of livestock and the production of various crops.

The school was intended also to function as an agricultural experiment center. However, little was accomplished in this connection aside from the fact that a limited number of imported varieties were grown. The seed samples used came principally from those supplied to Ethiopia by the Food and Agriculture Organization.

The curriculum, facilities, and staff were never brought to the recognized standard of secondary schools in Ethiopia and, as a result, the school was closed in 1952. In September of that year 25 students were transferred to the Jima Agricultural Technical School which was operated jointly by the United States technical assistance group and the Ethiopian Government.²

In October, 1953, the school was re-opened by the

¹Ibid., p. 69.

²Technical Cooperation Service to Ethiopia. Monthly report of the Service. September 30, 1952. Addis Abeba, Ethiopia. (Mimeo.)

Ministry of Agriculture and was named the Ambo Agricultural School. It is being so operated at the time of writing. The School is utilizing a compound and buildings formerly used in connection with a provincial palace. However, a considerable amount of new construction has been undertaken.

The School is situated in the town of Agere Hiywet in the western part of Shewa Province. Though not as high as the plateau country near Addis Abeba, this area is endowed with about 35 inches of rainfall and a cool climate. A small stream provides a supply of water for livestock, for irrigation, and for other uses. The School has acquired about 40 hectares (98.8 acres) of relatively fertile land lying adjacent to the compound. The soil is of the typical highland type, that being black in color and high in clay content.

From October, 1953, through the present, the school has been operated by a competent German staff under the directorship of W. Wunderlick. The staff includes five instructors, one engineer, and one farm manager.¹ All instruction is in English. During the academic year ending in July, 1955, about 1200 classes were met by the school's instructors.¹

When the school was reopened in 1953 provision was made for instruction to be offered in grades nine through 13, leading to a vocational certificate. By accepting secondary

¹W. Wunderlick. Ambo Agricultural School. Agere Hiywet, Ethiopia. (Personal interview). April, 1956.

students from elsewhere, selecting the better students, and admitting them at various levels, grades nine through 11 were immediately instituted. The drop-out rate among students has been very low.

The instructional offering at the Ambo Agricultural School includes basic science, mathematics, English, Amharic, animal husbandry, crop production and processing, farm economics, and farm mechanics. In addition to classroom instruction which is given five mornings per week, the students are required to work the equivalent of about two and one-half days per week to help pay for their board and room. This consists of work on the school grounds, on the school farms, or with the school livestock.

For use in the production of crops and for instructional purposes, the School has acquired a considerable amount of agricultural equipment, some of which originated in shipments provided by the United Nations Relief and Rehabilitation Administration. Equipment which was acquired in this manner includes a D-4 caterpillar tractor, tillage tools, planting and harvesting equipment, and electrical shop tools. A number of German-made agricultural machines have been introduced since 1953.

A number of outstanding field projects have been carried out by students and instructors. Two of these projects will be mentioned. The first had to do with the construction of a

modern and functional dairy barn on the school compound. The barn, one of the few such barns in Ethiopia, has about 200 square meters of floor space and was designed to facilitate the production of a clean milk supply for the school. All structural material used in the building was unsawed eucalyptus cut locally. To supply part of the feed for the milking herd, a large silo was built adjoining the barn. This is one of very few silos in the country. Its use in the plateau climate will be an experimental venture.

A second major field project carried out by the staff and students was the construction of a dam across a nearby stream for the purpose of storing water and raising the water level to provide irrigation water for experimental plots and for a part of the school farm. To permit construction of the dam, it was necessary to divert the stream. This was done and the staff and students worked in continuous shifts for three days and nights on the construction of the dam.¹

The availability of irrigation water has made possible a more diversified variety testing program. Although no breeding work has been done at the school, varieties of various crops have been imported, some from outside of the province and others from outside of Ethiopia, in an effort to find ones which will produce well under conditions found in

¹Ibid.

the western part of Shewa Province. During the 1955 growing season 105 different varieties were grown experimentally at the school. Ninety-five of them were introduced from outside the province. Twenty-five of the better-producing varieties were carried over for planting at the beginning of the 1956 growing season. On the basis of the first year's trials one Indian variety of imported alfalfa showed particular merit.

Jima Agricultural Technical School

Through an agreement signed on June 24, 1952, by the representatives of the United States and Ethiopian governments, provision was made for the establishment and operation of the Agricultural Technical School at Jimma in Kefa Province. In addition to its function as an agricultural secondary school, the Jimma School was intended to provide interim college training facilities until the time when the instructional program could be gotten underway at the Imperial Ethiopian College of Agriculture and Mechanical Arts.

The Ethiopian Government contributed Ethiopian \$350,000 (United States \$140,000) to a joint fund during the years 1952 and 1953. In addition, it supplied land and buildings for the School and experiment station. The United States Government contributed Ethiopian \$812,500 (United States \$325,000) during the same period of time and also provided

the services of the director and staff.¹ As has been true of the operation of all cooperative projects, provision has been made for the Ethiopian Government to assume an increasing proportion of the financial responsibility with each yearly budget. In the case of the Jima Agricultural Technical School which has been in operation for 5 years, the Ethiopian Government has taken over most of the financial responsibility exclusive of instructor's salaries. The discussion concerning the Jima Agricultural Technical School will be divided into five parts; namely, administration and staff, physical plant and facilities, resident instruction, research, and extension.

Administration and staff

The Jima School has been planned as an integral part of the overall agricultural education program. It is one of two agricultural secondary schools in the country. Eventually, according to plan, there will be one in each province. When this goal has been attained, the secondary schools will serve as provincial centers for agricultural education, research, and extension. Secondary graduates from these and general secondary schools in all parts of the country may receive post-secondary training at the Imperial Ethiopian

¹United States Operations Mission to Ethiopia. Point 4 program in Ethiopia. A list of basic agreements. Addis Abeba, Ethiopia. (Mimeo.) September, 1954. p. 1.

College of Agriculture.

The administrative responsibilities of the school are in the hands of the director who is responsible to the co-directors. The latter are the Minister of Agriculture and the Director of the United States technical assistance mission. Close cooperation is maintained between the staffs of the Jima School and the College of Agriculture.

The Jima Agricultural Technical School began operating in October, 1952, with only secondary students enrolled. The first and second years of college instruction were added as the leading class progressed. At present the School offers 4 years of secondary level instruction and the first and second years of instruction at the college level.

At the time the School was opened, in 1952, there were seven instructors on duty. All were from the United States. Additional personnel were employed when the first college instruction was offered and more were added when the second year of college was made available. The 1955-1956 school year began with 13 staff members.¹

Physical plant and facilities

The compound occupied by the School was formerly an Italian military center. Most of the buildings were of a

¹Jima Agricultural Technical School. Bulletin (School catalog). 1955-1956. Jima, Ethiopia. (Mimeo.)

permanent-type construction but were in a low state of repair when the American staff arrived. It was not an encouraging sight that greeted the group. Hi W. Staten, who visited the school compound a short time before the first instructors arrived, described it in the following words:

. . . . The campus, if one could call it that, was a wilderness. Jimma [Jima] is about 2,000 feet [609.8 meters] lower than Addis Ababa. Addis Abeba and receives about 60 inches [1524 millimeters] of rainfall annually. It was warm, raining, and muddy. The flies were very bad. I wondered if a staff of seven people, college men and their wives and families, could ever make a home for two years in that place.¹

The task of converting the "wilderness" into a suitable campus has been a long and arduous one. A tall growth of semi-tropical vegetation was cleared away and sufficient repair of buildings and equipment was made to permit the beginning of classes within 1 month after the staff arrived in Jima. Improvement, construction, and beautification have gone on continually during the 5-year period since the opening date. To the distinct credit of the staff and students, the campus is now neat and attractive.

The buildings vacated by Italians were used without major alteration for the first 2 years; however, they were not satisfactory. Many additions and improvements have been

¹Imperial Ethiopian College of Agriculture and Mechanical Arts. Soils and Plant Science Department. First annual report. July 1, 1952--June 30, 1953. Addis Abeba, Ethiopia. (Unpublished typewritten rept.) p. 2.

made since the School opened. Contracts were let for certain new construction including a livestock barn, a well and water system, and a dormitory-cafeteria. The latter structure has a capacity of 200 students and was ready for occupancy during the latter half of 1954. The water system was completed early in 1955.

Land has been made available to the School for experimentation and for the production of food. Several farms totalling about 60 hectares (148.2 acres) are presently used for these purposes. All of this land is located within 10 kilometers (6.2 miles) of the School. A sizable part lies adjacent to a year-round stream and may be irrigated. Additional land has been requested.

The Jima Agricultural School is an integral part of the agricultural education program in Ethiopia. From 1952 to the time of writing it has been the primary center of teaching and research in the field of agriculture.

Resident instruction

The Jima Agricultural Technical School, although implemented by United States personnel and patterned to some extent after American agricultural schools, is not alone an American educational institution transplanted in Ethiopia. Rather, it is a school adapted to meet the needs of the Ethiopian people and their country's agriculture. The

school's educational program represents an effort to utilize the knowledge and experience gained elsewhere to bring about a development of human and natural resources in Ethiopia particularly with respect to agriculture. The objectives of the School as stated in the school bulletin indicate how this is to be accomplished. They are as follows:

1. To prepare the student for further study in the field of agriculture.
2. To prepare the student for positions of leadership in the government and the commercial organizations of the nation.
3. To give the student sufficient academic background and practical training to enable him to organize and maintain his own farm.
4. To give the student an understanding of history and the importance and possibilities of his own country.
5. To teach the student to become a constructive citizen in his own country.
6. To teach intelligent conservation of natural resources.
7. To develop better health habits and improve sanitation.
8. To give the student a better understanding of the world about him in order that he may appreciate his neighbors and profit from their experiences as well as lending a helping hand to them when he may.
9. To serve as a community center for this (south-western) section of Ethiopia.¹

¹Jima Agricultural Technical School, op. cit., pp. 2-3.

A particular effort has been made to teach students that there is dignity in work with the hands and that such work is vital to research and technical advancement. The school's philosophy on this matter is clearly stated in the following quotation taken from the school bulletin:

Students must be taught the need for and the dignity of work with the hands. It is a fallacy to assume that education is a stepping stone from work with the hands to work with the brain. Education should be an enrichment of the life and labor rather than an escape from a life of labor.¹

The Jima Agricultural Technical School opened for instruction on October 13, 1952. During that year the enrollment was limited to a number of secondary school students commensurate with the limited supplies and facilities available at the date of opening. In October, 1953, the first, or freshman year of college was offered. During the following year, 1954, the second year of college instruction was instituted. The enrollment by years for both high school and college is presented in Table 17.

The secondary school program, although preparatory to college entrance, represents a departure from the usually-accepted secondary curriculum in Ethiopia. Some of the so-called cultural courses have been omitted and in their place have been substituted practical courses which are considered necessary to fruitful farm living.

¹Ibid.

Table 17. Enrollment at the Jima Agricultural Technical School^{a,b,c}

Year	Number enrolled in secondary school	Number who received diploma	Number enrolled in college (2 years)	Number who received certificate
1952-53	79	19	none	none
1953-54	130	17	10	none
1954-55	130	15	33	13
1955-56	143	20	32	18
1956-57	158	47 ^d	57	24 ^d
Total	640	118	132	55

^aImperial Ethiopian College of Agriculture and Mechanical Arts. Second annual report. Addis Abeba, Ethiopia. (Mimeo.) January, 1955. p. 6.

^bImperial Ethiopian College of Agriculture and Mechanical Arts. Third annual report. Addis Abeba, Ethiopia. (Mimeo.) January, 1956. pp. 3-6.

^cUnited States Operations Mission to Ethiopia. Point 4 Program in Ethiopia. A list of basic agreements. Addis Abeba, Ethiopia. (Mimeo.) September, 1954. p. 1.

^dAnticipated.

The courses required for graduation from secondary school are given in Table 18.

A brief statement concerning the four courses in agriculture will serve to explain the nature of instruction in that area. Agriculture I offered at the ninth-grade level consists of 2 hours of theory and 2 hours of laboratory per week throughout the entire school term of 36 weeks. It is a course

Table 18. Subjects required for a secondary school diploma at the Jima Agricultural Technical School.^a (1955-1956)

Grade	Subject	Hours per week	Length of instruction	Units of credit
9	English I	5	Full year	1
	General Science	5	Full year	1
	Agriculture I	3	Full year	$\frac{1}{2}$
	Amharic I	2	Full year	$\frac{1}{2}$
	Arithmetic	5	One semester	$\frac{1}{2}$
	Hygiene	5	One semester	$\frac{1}{2}$
10	English II	5	Full year	1
	World History	5	One semester	$\frac{1}{2}$
	Amharic II	5	One semester	$\frac{1}{2}$
	Biology	5	Full year	1
	Agriculture II	6	Full year	1
11	English III	5	Full year	1
	Chemistry	5	Full year	1
	Algebra	5	Full year	1
	Agriculture III	6	Full year	1
12	Economic Geography	5	Full year	1
	Ethiopian History	5	One semester	$\frac{1}{2}$
	Farm Shops	5	One semester	$\frac{1}{2}$
	Geometry	5	One semester	$\frac{1}{2}$
	Physics	5	One semester	$\frac{1}{2}$
	Agriculture IV	6	Full year	1
				16

^aJima Agricultural Technical School. Bulletin (School catalog). 1955-1956. Jima, Ethiopia (Mimeo.) p. 6.

in basic agriculture designed to give the student a general understanding of the various phases of agriculture.¹

Agriculture II is offered to tenth-grade students and

¹Ibid., p. 10.

consists of 6 hours of instruction and laboratory per week. One-third of the academic year is devoted to a study of dairying including the selection of dairy cattle; the feeding requirements and feeding of producing cows, calves, heifers, and bulls; and general management practices. One-third of the time is devoted to a continuation and expansion of horticulture begun in the first-year course. The remaining one-third of the time is taken up in hand-tool carpentry.

Agriculture III, which is offered at grade 11 consists of 6 hours of class and laboratory time spanning the two semesters. The first one-third of the academic year is given to a continuation and extension of principles and practices of field crop production begun in Agriculture I. The next one-third of the time is utilized in a study of the housing, feeding, and management of poultry and swine. The final period is devoted to tractor driving and maintenance.¹

Agriculture IV is offered to senior students in the secondary school. The class is scheduled for 3 hours per day on two afternoons per week. It includes both laboratory and field work. The first one-third of the academic year is utilized in a study of soils. The course includes land preparation, erosion control, soil development, infiltration, fertilization and cropping practices. The next one-third of

¹Ibid., p. 11.

the year is devoted to farm mechanics, specifically to measurements, measuring instruments, and drawing. The final period is given to the production, management, and diseases of beef cattle and sheep.¹

The two-year college curriculum instituted at the Jima Agricultural Technical School follows the pattern of basic courses in agriculture offered at the Oklahoma Agricultural and Mechanical Arts College. The courses offered to first and second year students at the Jima School are presented in Tables 19 and 20 respectively.

Table 19. Courses offered first-year college students at the Jima Agricultural Technical School^a (1955-1956)

Semester	Course title	Course number	Semester credit hours
First	Physical geography	113	3
	General horticulture	113	3
	Feeds and feeding	113	3
	Botany	114	4
	General chemistry	114	4
Second	English	113	3
	Field crops	113	3
	Poultry production	123	3
	Zoology	123	3
	Shops (Initiated projects)	103	3

^aJima Agricultural Technical School. Bulletin (School catalog). 1955-1956. Jima, Ethiopia. (Mimeo.) p. 16.

¹Ibid.

Table 20. Courses offered second-year college students at the Jima Agricultural Technical School^a (1955-1956)

Semester	Course title	Course number	Semester credit hours
First	Driving	201	1
	Agricultural engineering	202	2
	Agricultural economics	213	3
	Dairy	213	3
	Organic chemistry	215	5
	Coffee processing and marketing ^b	211	1
	Pasture and storage crops	213	3
Second	English	213	3
	Agriculture Arithmetic	203	3
	Soils	204	4
	Animal husbandry	223	3
	Coffee production ^b	222	2
	Agriculture bacteriology	223	3

^aJima Agricultural Technical School. Bulletin (School catalog). 1955-1956. Jima, Ethiopia. (Mimeo.) p. 16.

^bCourse is not required.

In keeping with the school's philosophy that practice is a valuable aid to learning, both secondary school students and college students are required to work no less than two scheduled class periods each day or a minimum of 10 hours per week. However, this minimum applies only to second-year college students who are paid Ethiopian 25 cents (United States 10 cents) per hour for each hour's work over 10 up to a maximum of 14 hours. All students below this level are required to work at least 12 hours, and they receive Ethiopian 12.5 cents (United States 5 cents) per hour for time over 12 hours

up to a maximum of 16 hours per week. A student who has a grade average below the level of "C" may work for extra pay only after securing the approval of his counselor.¹

Work performed by students includes the maintenance of the experiment station; the production of feed crops, food crops, meat, and milk for use at the school; and the building, maintenance, and the repair of equipment and small structures. A few examples may be given. As a part of their education, students do most of the buying and slaughtering of beef animals used in the school cafeteria. They also maintain production records on milk-producing animals. They drive tractors to perform field operations. They hoe corn during the growing season, and pick the crop at harvest time. One student has a part-time job roasting coffee for use at the School. Another has a part-time job candling eggs. Students have received experience in many different kinds of work which should help them to broaden their education. Work activities as carried out at the School should be beneficial in the development of leadership.

In addition to the practical experience which students gain, there are other out-of-classroom activities in which they may participate. One of these activities is the participation in a 4H club which was organized on the School campus

¹Ibid. p. 27.

in December, 1952. Here, students are given an opportunity to develop leadership and cooperative abilities both of which are important to the future of Ethiopian agriculture. The establishment of 4H clubs and other agricultural groups such as Future Farmers in agricultural schools in Ethiopia was seen by the director of the United States technical assistance mission as an effective method of spreading improved methods of agriculture among the people.¹

Another important activity participated in by students is the annual agricultural field day first held in June, 1954, and held each year since. Students assume responsibility in planning, preparing for, and carrying out the field-day program. Observing the manner in which students assume responsibilities of the various stations and explain to the crowds the improved methods of agriculture has been a source of encouragement to the staff. Usually students make the explanation first in Amharic and then in English.

One of the most serious problems at the Jima Agricultural Technical School has been the selection of students for enrollment. The number who apply for entrance exceeds by a wide ratio the number that can be accepted under conditions of limited facilities of the School. Selection has been on

¹Technical Cooperation Service to Ethiopia. Monthly report of the Service. January 31, 1953. Addis Abeba, Ethiopia. (Mimeo.)

the basis of a number of factors including home province, previous academic achievement, farm background, and experience. Students are interviewed by two or more staff members. A lengthy interview is designed to acquaint the staff with the background and capabilities of the student.

An effort is made to give all provinces a fair representation at the School and to enroll students who are interested in agriculture and who are likely either to return to the family farm or to become engaged in a related agricultural pursuit. Consideration is given to previous academic achievement. Particular attention is given to a boy's background and experience if he is to enter the Jima School at some level above that of first-year secondary school.

From the standpoint of choosing students who would enter as high school freshman and remain in school to complete two years of college, the method of selecting students has not been entirely successful. This is shown in the records of the original high school sophomore class which consisted of 14 boys in September, 1952. By the time the class had progressed to the college sophomore year, it contained only three of the original group. A desirable class size was maintained by enrolling qualified students at various levels beyond the first year of high school. Among other classes at the School, the drop-out rate, although higher than desirable, has been lower than that for the aforementioned

class. Improvement in the quality of teaching now underway in elementary schools may help to correct this problem.

Research

The staff of the Jima Agricultural Technical School has devoted a great deal of time to research. This has not only contributed to the overall agricultural education program in Ethiopia, but it has added much to the instructional program of the School.

Part of this work has been conducted on the school compound which consists of about 20 hectares (49.4 acres). Other research has been carried on at one of several farms located within a short distance of the school compound. In all, about 60 hectares (148.2 acres) of land are available for research and for the production of feed and food. The land and facilities used in research make up the Jima Branch Experiment Station.

As has been explained in an earlier section, the area in which Jima is located is well suited to the production of crops. The soil is deep, well structured, and fertile. The average annual rainfall is about 1524 millimeters (60 inches). The main deterrent to production is the fact that frost occurs. Such occurrence, however, is infrequent at this altitude of 1720 meters (5642 feet). The discussion concerning research at the Jima Branch Experiment Station will be

divided into four parts, viz., soils, crops, grassland and pasture, and livestock.

Soils. No attempt has been made to establish a major soil testing or soils research program at the Jima School. However, the Jima staff has cooperated in such a program undertaken at the Imperial Ethiopian College of Agriculture and Mechanical Arts. The limited soils research which has been carried on at Jima has been of a service nature to crops research.

Crops. An extensive program of crops research has been initiated by agronomists at the Jima School. Early phases of this investigative work involved the collection and testing of many varieties of a wide range of crops. From this beginning, research at Jima has progressed to the evaluation of the more promising varieties. During the first two years that the School was in operation, an estimated 500 varieties of crops were imported from other countries for testing. Varieties supplied by the United Nations Relief and Rehabilitation Administration and the Food and Agriculture Organization also were utilized. Where possible, imported varieties have been compared with preferred local selections.

In connection with variety testing, experiments were designed to determine the best method of planting and the best date or dates for planting. A good example of the need for determining the date for planting is seen in the case of

cotton. This plant is generally grown as a perennial in Ethiopia. Almost nothing was known about the planting date that could be used to net the greatest production if the crop were to be grown as an annual. Another reason for studying planting dates was to explore the possibility of raising more than one crop in this area where the soil is deep and relatively fertile and where water for irrigation is frequently available.

The observations made in connection with variety trials during the first year did not permit the making of recommendations regarding crops for the Jima area. However, one or more varieties of certain crops did show promise for that area. These included forage sorghums, sweet sorghum, and soybeans. Among grasses, a "good" to "excellent" growth under nursery conditions was made by Bermuda, redtop, orchard grass, meadow fescue, annual ryegrass, Rhodes grass, King Ranch bluestem, and various love grasses. Among legumes, a similar growth was made by alfalfa, annual and biennial sweet clover, ladino clover, bur clover and lespedeza. The latter produced an excellent stand of forage during the first season. An order was placed for commercial seed.¹ Most vegetable crops produced well.

¹Imperial Ethiopian College of Agriculture and Mechanical Arts. First annual report. Addis Abeba, Ethiopia. (Mimeo.) January, 1954. pp. 77-101.

Imported varieties of certain crops made a relatively poor growth. These included corn, grain sorghum, cotton, and castorbeans. The results of small grain trials at Jima have not been encouraging. Most small grains have yielded poorly and have been heavily damaged by disease. Poor yield in most instances has been due to one or more factors including bird damage, frost, lodging, and disease.¹ The preliminary evaluation of many crops was supported by successive plantings and by additional experimentation. A statement concerning each of several specific areas of research will be given. These include corn, pasture sorghum, vegetable crops, coffee, crop diseases, and a year-round cropping system.

During the 1954 growing season, five varieties of hybrid corn were compared with three local selections. The test was not replicated and therefore was not analyzed statistically. However, the following observations were considered valid:²

1. The imported varieties are not superior to local selections for planting in the Jima area.
2. Improvement of local varieties is the logical approach to corn improvement.
3. Resistance to bird damage and disease is of major importance in bringing about improvement.

¹Ibid.

²Imperial Ethiopian College of Agriculture and Mechanical Arts. Second annual report. Addis Abeba, Ethiopia. (Mimeo.) January, 1955. pp. 25-26.

The comparison of imported versus local varieties of corn was continued in 1955. This time local selections were compared with United States varieties and also with 12 varieties developed by the Rockefeller Foundation in Ecuador. Again Ethiopian selections outyielded all imported varieties. The highest yield was 84.7 quintals per hectare (135.1 bushels per acre).¹

Pasture sorghum made an excellent showing during the 1954 and 1955 growing seasons. On the basis of results obtained over the 2-year period pasture sorghum was recommended as a temporary crop for the area. Local selections of grain sorghum withstood bird damage better than imported varieties.

A wide variety of garden vegetables have been tested at the Jima Agricultural Experiment Station. There has been a twofold purpose behind these trials. First, it was necessary to produce a large part of the school's food supply. Second, it is believed that home gardening is one way to bring about rapid improvement in the diet of the average rural family. Excellent yields have been obtained from a large percentage of the varieties of most vegetable crops. Quality is generally good. Beans, root crops, greens, and cole crops have produced extremely well. Continuous production has been practiced under irrigation. All students are required to

¹Ibid., pp. 17-18.

spend part of their work hours in the school vegetable gardens.

Coffee is the main cash crop in Ethiopia. The Jima School is located in the heart of the principal coffee-producing area in Ethiopia. More work has been done with coffee at the Station than with any other crop. The establishment of a coffee research program is a long-time operation due to the length of time required for the growth of trees. Because of this little statistical analysis of research has been possible to date, although a great deal of research has been initiated. A brief survey of the work underway will be presented.

One of the first experiments begun was a variety test. Coffee seeds and seedlings were imported from all parts of the world. By the close of 1953 approximately 7,500 coffee seedlings representing 49 varieties had been established.¹ In this experiment six varieties, three pruning methods, and four mulching treatments are being investigated. At the time of writing, data had not been analyzed.^{2,3} The layout of

¹Much of the work of collecting varieties was done by Dr. Pierre G. Sylvain of the Food and Agriculture Organization. His work has been briefly described in an earlier section dealing with that agency.

²Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., pp. 44-51

³Imperial Ethiopian College of Agriculture and Mechanical Arts, Third annual report, pp. 33-38.

this and other coffee experiments was accomplished under the direction of several specialists including Dr. Carl E. Marshall, Director of the Statistical Laboratory at Oklahoma Agricultural and Mechanical College. Valuable suggestions concerning this and other coffee research have been received from research centers in many countries including Guatemala, Kenya, Tanganyika, and Brazil.

A second experiment which has been initiated is the "sun hedgerow", a system of planting designed elsewhere in the world for the purpose of stabilizing yield. Under this system a series of rows planted about one meter apart are alternated with fallow land. As production begins to decline in the hedgerows, new trees are planted on the fallow strips. When new trees are in production the older trees are removed and the land is fallowed. In this experiment the comparison includes two broad types of trees, three-row hedge versus two-row hedge, fertilized versus nonfertilized plots, and methods of transplanting trees. Because the trees will not come into full production for many years, no conclusive results are available at the time of writing.^{1,2}

Other experiments underway are designed to study shade requirements, hand processing methods, the use of wild plants

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Second annual report, pp. 44-51.

²Imperial Ethiopian College of Agriculture and Mechanical Arts, Third annual report, pp. 33-38.

in coffee production, and other aspects of coffee production and processing. In connection with the coffee research program a large nursery has been established for the purpose of starting coffee seedlings which can be distributed to farmers. This work has been described in the section concerning the coffee development project.

A special planting consisting of four trees each of most available species of coffee has been made for the purpose of providing demonstrational material for classroom use and for the purpose of providing material for use in coffee breeding. The latter work is planned to begin in the near future.

Disease is a major factor in the restriction of crop yields in the Jima area. The problem is heightened by the mild and relatively humid climate. In 1954, a plant pathologist was employed on the school staff. During 1954 and 1955, more than 100 diseases were recorded; most of this number were identified. Recommendations were made for the control of certain diseases. Because of the cost, chemical control has been deemed impracticable.¹ The best solution to the problem of disease is considered to be through cultural methods, and through the introduction and breeding of disease-resistant varieties.¹

Consideration has been given to the development of a

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Second annual report, pp. 17-18, 31.

year-round cropping system for the Jima area because of the fertile soil and because of the relatively heavy rainfall which averages about 1524 millimeters (60 inches) per year. Corn is the principal food crop. According to information gained from trials, it appears to produce best when planted prior to the heavy rain in which case it is ready for harvest about 5 months later. It would be desirable, from the standpoint of food and feed production, if more of the growing season could be utilized. There is need for the planting of at least one soil-building crop in a year-round cropping system.

Grassland and pastures. Limited attention has been given to the improvement of natural pastures by one of two methods; namely, through the removal of brush and large weedy plants and through renovation. On the basis of experience at the Jima School it has been estimated that the removal of brush and large weedy plants would increase many pasture areas by 50 percent. Experience has shown that in the Jima area both grasses and legumes will appear spontaneously on land which has been cleared of brush.¹

Various seed mixtures have been used in the renovation of pastures. On well-drained land Bermuda grass, annual ryegrass, dallis fescue, Kentucky fescue, Rhodes grass, and

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Third annual report, p. 29.

Kikuyu grass have produced well. The latter is a native grass of the Bermuda type. The variety, enduring clover, has been used in pasture seedings with excellent results. It has withstood grazing and competition well. Alfalfa and ladino clover have produced fairly well in pastures where a mixed seeding has been used. Generally, however, native legumes are more hardy than introduced legumes and are particularly valuable in areas where heavy grazing is likely to occur.¹ On seasonally wet pastures seedings of dallis grass, Kentucky fescue, and giant canary are recommended as the best grasses that have been found to date.¹

Livestock. Research in connection with this phase of agriculture has centered around the importation of livestock and the improvement of native livestock through crossbreeding. In September, 1953, a small number of Brown Swiss cattle were purchased in Switzerland. The lot included five bred heifers and one bull. Brown Swiss cattle were chosen for the triple purpose of milk and meat production and for draft. Cattle from the mountainous country of Switzerland were chosen because the climate and altitude of that country are somewhat similar to conditions in Ethiopia.

The cattle arrived at the seaport of Aseb in October, 1953. Rinderpest serum was administered immediately, and,

¹Ibid. pp. 26-29.

in addition, the cattle were hand sprayed in an attempt to protect them from flies and ticks. The trip from Aseb to Jima was made by plane. Early in November, 1953, one heifer calved normally. Within 4 weeks after their arrival in Jima, four heifers had died without calving. The remaining cow and calf and the bull became sick but recovered after extended treatment. Veterinarians on duty with the Food and Agriculture Organization diagnosed the disease as heart water, a tick-borne disease.¹

As a result of heavy disease loss, increasing the number of Brown Swiss has been a slow process. However, the cow and bull eventually showed complete recovery. They were unrelated and two calves were obtained from this dam and sire during the next two years. Both offspring were bull calves which was desirable from the standpoint of producing crossbred cattle. By the end of 1955 the Brown Swiss herd consisted of one 4-year old bull, one 4-year old cow and two bull calves. Records were kept on the milk production of the cow. Bulls were used in breeding native cows.

Because of the serious disease problem connected with the importation of cattle, consideration has been given to the improvement of milk and meat production through the upgrading of native cattle. These cattle display natural

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, First annual report, p. 166.

immunity to heartwater disease and certain other maladies affecting imported cattle. To begin a breeding program, 21 Borona cattle were purchased in southern Ethiopia. These are the best milk-producing cattle among native stock in Ethiopia. The Borona cattle were driven to Jima.¹

The first native cow was bred to the Brown Swiss bull in December, 1954, and the calf was born in September, 1955. The first seven crossbred calves averaged 27.3 kilograms (60.0 pounds) compared to an average of 19.0 kilograms (41.8 pounds) for five calves previously dropped by the same cows. The first two purebred Brown Swiss calves dropped at Jima averaged 42.8 kilograms (94.2 pounds).^{2,3}

The average milk production of 10 Borona cattle during the first 10 months of lactation was 867.0 kilograms (1907.3 pounds). The one Brown Swiss cow produced 2196.6 kilograms (4832.5 pounds) during the first 12-month period. On a 10-month basis the Brown Swiss production exceeded the average of the native cows by more than 110 percent. The butterfat² content of the milk from Borona cattle averaged slightly over 5 percent while that from the Brown Swiss was 3.8

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Second annual report, pp. 61-68.

²Jima Branch Experiment Station. Annual progress report. Jima, Ethiopia. (Mimeo.) January, 1956. pp. 2-4.

³Imperial Ethiopian College of Agriculture and Mechanical Arts, First annual report, p. 180.

percent. At the time of writing no crossbred animals had come into production.

The poultry section of the Jima Agricultural Technical School has carried on limited research in connection with the importation of chicks used for production and for teaching purposes. The importation of chicks was first attempted in 1953 when 600 chicks including 250 Rhode Island Reds, 200 Australorps, and 150 white Leghorns were purchased from a hatchery in Nairobi, Kenya. The chicks arrived in Jima by plane on September 28, 1953, after an unscheduled 2-day layover enroute. There were 600 chicks alive upon arrival, however some appeared weakened from hunger and the extended time in shipment. By December 31, 1953, there was an average death loss of 19.4 percent. Loss was highest among Australorps and lowest among Rhode Island Reds.¹

Aside from the rather heavy death loss, the greatest problem encountered was that of finding a suitable ration. Nutritional deficiencies were noted in the chicks despite the use of different rations made up of corn, barley, wheat, nug meal, fish meal, bone meal, and salt. One nutritional deficiency evidenced by a curled-toe condition was corrected by the use of stillage left from the brewing of talla, a native alcoholic beverage. Other difficulties were not so

¹Ibid., pp. 177-179.

easily corrected. The need for a fortified feed for starting young chicks was clearly pointed up.

A second shipment of 773 chicks consisting of 79 Australorps, 218 Rhode Island Reds, and 476 White Leghorns arrived at Jima on May 2, 1954. This time the transportation of the chicks was effected in a more expeditious manner. This, together with experience gained in feeding, was credited with keeping the loss to below 13 percent at the end of three months.¹

Since 1954, oil-heated incubators have been employed in an attempt to produce chicks at the School. The experiment has been only partially successful. Relatively low hatching percentages have been obtained. The lowest was 17 percent in June, 1955. The highest percentage among the first eight hatches was 45 percent in November, 1955. It is believed that the hatching percentage will increase over a period of years after the forces of natural selection have been operative for some time.¹

Improved poultry stock has been utilized in various ways. The best birds from the three breeds have been selected for breeding stock and will be retained at the School. A part of the remaining hens and roosters have been distributed to students, other schools, and farmers. Students may purchase

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Second annual report, p. 58.

laying hens and roosters for use at home. Culls have been used as a source of meat in the School cafeteria.

Extension

The staff of the Jima School has had little time to carry on extension activities although an effort has been made to help farmers in the immediate vicinity of the School.

Imperial Ethiopian College of Agriculture and Mechanical Arts

On May 15, 1952, representatives of the Ethiopian and United States Government entered into an agreement which provided for the establishment of the Imperial Ethiopian College of Agriculture and Mechanical Arts. This institution was intended to be the principal center of agricultural and mechanical arts education including resident instruction, research, and agricultural extension. The cooperating agency was the Ministry of Education.¹

Under the agreement, a contribution of Ethiopian \$1,000,000 (United States \$400,000) was made by each of the two governments toward a joint fund for the project. In the following year, 1953, a sum of Ethiopian \$18,750 (United States \$7,500) was contributed by each government. Additional con-

¹United States Operations Mission to Ethiopia, op. cit., p. 3.

tributions were made to the joint fund during succeeding years. The United States Government has provided the services of architects and administrators as well as teaching, research, and extension personnel. The Ethiopian Government made available an area for the campus and experimental farms.

The discussion concerning the College will be divided into five main parts. These include administration and staff, physical plant and facilities, resident instruction, research, and extension. The order in which the several topics will be considered does not necessarily follow the order in which development occurred. For example, research and extension activities were begun in 1953. This was about 2 years before resident teaching was instituted.

Administration and staff

The basic organization of the Imperial Ethiopian College of Agriculture and Mechanical Arts follows somewhat that of the Oklahoma Agricultural and Mechanical Arts College. The latter has entered into a contract with the United States Government to oversee the establishment and temporary operation of the Ethiopian institution.

The administration of the College of Agriculture, together with the general administration of the overall agricultural education program in Ethiopia including the proposed system of secondary schools, is the responsibility of the president

of the College and his staff. Following the completion of the original agreement a small administrative staff consisting of four persons arrived in Ethiopia. The date of the arrival was June, 1952. The small staff began, at once, the task of planning an improved program of agricultural education for Ethiopia.

The first major problem undertaken was that of finding a suitable location for the College and a national experiment station. It was considered desirable for the two to be situated within close proximity of each other. It was agreed that the site should contain soils representative of the principal types found in the crop-producing areas of the country, a suitable climate and altitude, an adequate rainfall, and adequate supply of good water, relative freedom from malaria and other serious diseases, and accessibility to one or more forms of transportation. In addition it was considered highly desirable for the College and experiment station to be centrally located with respect to the several provinces.

The staff, assisted by certain persons from the Oklahoma Agricultural and Mechanical Arts College, proceeded to inspect all areas which were suggested as a possible location for the College and experiment station. Trips were made to Shashemene in the south, to Agere Hiywet and Lekemt in the west, to Dese and Gwondar in the north, to Dire Dewa and

Harer in the east, and to numerous localities near the Capital.¹ All of these sites presented certain desirable features. However, none of them entirely satisfied all of the aforementioned requirements. Two or three locations were considered satisfactory. One site near the town of Debre Zeyt in Shewa Province was recommended as the most satisfactory of all. However, after long deliberation the decision was finally reached to establish the College near the village of Alem Maya in Harer Province. An important consideration in the final decision was the fact that the Emperor had, at some previous date, made a commitment to establish a college in Harer Province.

From the technical standpoint, the Alem Maya site was satisfactory in all respects except that it was not centrally located. The predominating red soil of the area was representative of the soil found in the southern and eastern parts of the Central Plateau. The rainfall was about 600 millimeters (23.6 inches) per year. A favorable climate at the site appeared conducive to the growing of a wide variety of crops. Water was available for domestic use and for irrigation. The site was served by a good road. Rail and plane facilities were within 56 kilometers (34.8 miles).

A compromise was reached regarding the location of the

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Soils and Plant Science Department, op. cit., pp. 1-8.

experiment station. The decision was made to establish it at Debre Zeyt about 50 kilometers (31 miles) southeast of Addis Abeba. The soil of this location well represented the heavy black soil of the Central Plateau. Some brown soil was found on station land. Although the rainfall was somewhat low, there was an adequate supply of water for irrigation. The location appeared to be suited to the growing of a wide variety of crops. The question concerning the location of the College and the experiment station was resolved during the early months of 1954.

While staff members were on the various trips throughout Ethiopia every opportunity was taken to collect information concerning the country, the people, the soils, and the crops. Numerous soil, crop, and grass samples were collected from all parts of the country. Interviews were conducted with many provincial officials and with a large number of farmers and rural people. Some insight was gained into the customs of the people, their problems, and their attitude toward schools and education. In this way, much valuable information was collected for use in organizing and effectively implementing a program of agricultural education.

Throughout all of the planning very close contact was maintained with officials of the Central Government. One or more officials accompanied the college staff on all major trips. As stated in the original agreement, the project was

a cooperative effort between the two governments. It was in the interest of the United States Government for Ethiopians to gain all possible experience in the endeavor in order to hasten the time when the latter could assume full administrative and financial responsibilities.

By June, 1953, a total of 11 persons were on duty with the College and had arrived in Ethiopia. The group included the president and dean of the College, the head of Soils and Plant Science Department, the head of extension, the head of the soils section, the head of animal husbandry, an agronomist, an entomologist, two extension supervisors, and one administrative assistant. Nearly all of the staff were from the state of Oklahoma. Most were members of the staff at Oklahoma Agricultural and Mechanical Arts College.

Physical plant and facilities

Ethiopia had only limited facilities to offer for use as college offices. The skeleton staff on duty in Ethiopia in 1952 arranged for the use of a vacant structure located in the northwest part of the city of Addis Abeba. As the staff grew, more space was needed. The use of a new structure, a former military headquarters building of the Occupation Government, was acquired. The activities of the College were carried on from this location from 1953 until the newly-constructed facilities at Alem Maya were ready for occupancy

in September, 1956. Certain administrative, extension, and research personnel remained at the Capital even after the new site was occupied.

The latter consisted of about 445.3 hectares (1100 acres) of land, part of which occupied a small valley containing the stream-fed Lake Alem Maya. This lake borders one side of the college property. The remainder of the land is rolling or hilly. An estimated 194.3 hectares (480 acres) of land are cultivable. Numerous deep gullies have formed on the adjacent sloping land. Stream water is available for irrigation. Two wells were drilled on the site and now supply relatively pure water in considerable volume. An altitude of approximately 1980 meters (6494 feet), at the lake surface, decidedly moderates the intense heat of the surrounding lowlands. A rainfall of about 600 millimeters (23.6 inches) is largely concentrated during the months of June, July, August, and September.

On May 3, 1954, a contract was let for the construction of 15 college buildings including an administration building, a dormitory, a combination library and cafeteria, a classroom building, a clinic, and ten staff dwellings. Excavating was begun soon after the contract was awarded. Actual construction of the buildings got underway in October, 1954.

In addition to the aforementioned buildings, plans have been drawn for a shop building and a building for housing the

power plant. Following the 1955 exposition held in Addis Abeba, the College acquired possession of a large steel structure which had been used to house the United States display at the exposition. This building was dismantled, transported to the college site, and reassembled there.

Plans for the buildings were prepared at the Oklahoma Agricultural and Mechanical Arts College. The design of buildings was, in all cases, simple but functional. Plans were in English. The construction contractor was Italian. Plans were prepared to utilize indigenous materials and skills. The former included cement which is being produced at Dire Dewa and building stone which is available in most parts of Ethiopia. One indigenous skill, that of stone cutting, was utilized extensively. The walls of all permanent buildings were made of stone.

Most facilities which have been constructed have been designed to accommodate 200 students. The dormitory and the combination cafeteria-library are an exception. The dormitory will accommodate about 100 students. The capacity of the cafeteria has been diminished by the utilization of some space within the building for a school library. Therefore, before 200 students can be enrolled additional dormitory space and a library should be constructed.

The construction of the physical plant has been a difficult and time-consuming task. The American architectural

engineers who supervised the construction reported that the contractor had considerable difficulty in complying with the specifications of the plans. The contractor expressed the view that he had not previously encountered such infinite detail in construction plans.¹

At the time the original agreement was signed, the view was expressed that classes at the College might commence in the latter part of 1953.² However, at the time the construction began, it was anticipated that classes could begin in October, 1955. Classes did get underway on the campus in November, 1956. The delay of one year in opening the College necessitated offering the junior year of college instruction at Addis Abeba during the academic year 1955-1956. This instruction was for students who had previously completed their second and final year at the Jima Agricultural Technical School.³

Resident instruction

The instructional program of the Imperial Ethiopian College of Agriculture and Mechanical Arts has been patterned

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 5.

²Technical Cooperation Service to Ethiopia. Monthly report of the Service. July 9, 1952. Addis Abeba, Ethiopia. (Mimeo.)

³Classroom and housing facilities for the students were made available by the University College in Addis Abeba.

after that of the land-grant institution, Oklahoma Agricultural and Mechanical Arts College. The Ethiopian College of Agriculture has been organized on a 4-year semester basis and has offered a bachelor of science degree in one field only, general agriculture.

On November 5, 1956, when instruction commenced at the Alem Maya site, there were nine instructors on duty with the College. In addition, all wives of the staff members were involved with office, teaching or health responsibilities during the first year of operation. Amharic instruction was given by an Ethiopian holding a bachelor of science degree from the United States. With the exception of the latter, all staff members were citizens of the United States of America employed by the United States technical assistance mission to Ethiopia.

Thus far, there have been no areas of specialization for the students. However, in addition to being permitted a limited number of electives, each student is encouraged to spend extra time studying material in the area of his interest such as animal husbandry, agronomy, agricultural economics, agricultural mechanics, dairying, soils, biochemistry, or extension. The courses offered juniors and seniors during the 1956-1957 school year are shown in Table 21 and Table 22 respectively.

During the first year of operation, the College accepted

Table 21. Courses offered third-year college students at the Imperial Ethiopian College of Agriculture and Mechanical Arts^a (1956-1957)

First semester		Second semester	
Course title	Course No.	Course title	Course No.
Public speaking	312	Farm management ^b	323
General genetics	313	Advanced horticulture ^b	323
General entomology ^b	313	Soils ^b	325
Poultry management ^b	313	Forestry ^b	313
Vegetable production	313	Plant breeding ^b	413
Animal breeding	323	Physical education	321
		Meteorology ^c	401

^aLoris A. Parcher. Alem Maya, Ethiopia. Information concerning progress in the establishment of the Imperial Ethiopian College of Agriculture and Mechanical Arts. (Private communication.) April, 1957.

^bCourse has laboratory.

^cElective.

students in the junior and senior years of college and also in the ninth and tenth grades of secondary school. The acceptance of secondary students was a matter of expediency and is not expected to be continued beyond the year, 1956-1957. During the 1957-1958 school year, it is planned that the College will accommodate only college students. The present plan is for a 4-year course of instruction to be offered. No plans have been made for the training of girls

Table 22. Courses offered fourth-year college students at the Imperial Ethiopian College of Agriculture and Mechanical Arts^a (1956-1957)

First semester		Second semester	
Course title	Course No.	Course title	Course No.
Introduction to veterinary medicine	414	Common diseases and parasites of domestic animals	424
Farm machinery ^b	322	Soil and plant nutrition	413
Poultry management ^b	313	Marketing farm produce	423
Cereals ^b	423	Animal nutrition ^c	423
Livestock seminar	432	Plant physiology ^c	423
Horticulture seminar	422	Farmstead structure ^{b,c}	422
		Social orientation ^{b,c}	431
		Woodworking ^c	431
		Meteorology ^c	401
		Physical education ^c	321

^aLoris A. Parcher. Alem Maya, Ethiopia. Information concerning progress in the establishment of the Imperial Ethiopian College of Agriculture and Mechanical Arts. (Private communication). April, 1957.

^bCourse has laboratory

^cElective

in the College.

A total of 89 students were enrolled at the College during the 1956-1957 academic year. Eleven of these were college seniors; 18 were college juniors; 25 were tenth grade students; and 35 were ninth grade students.¹ All of the college students were received from the Jima Agricultural Technical School. The secondary school students were received from various schools throughout the country. Members of the 1957 class chose various areas of interest. These were as follows: animal husbandry, two; agronomy, two; agricultural economics, two; agricultural mechanics, one; dairying, one; soils, one; biochemistry, one; and extension, one.

As facilities of the College are improved and as research is gotten underway, it is expected that advanced students will be given an opportunity to expand their learning by participating in research, in the management and care of college livestock, and in the production of food and feed on college farms. While performing such tasks college students should acquire valuable experience outside their classes. In this connection it should be noted that students are paid for work. Senior students receive Ethiopian 50 cents (United States 20 cents) per hour for all work over 6 hours per week.

¹Loris A. Parcher. Alem Maya, Ethiopia. Information concerning progress in the establishment of the Imperial Ethiopian College of Agriculture and Mechanical Arts. (Private communication). April, 1957.

Juniors receive Ethiopian 40 cents (United States 16 cents) per hour for all work over 8 hours per week. Secondary students were paid Ethiopian 12.5 cents (United States 5 cents) per hour for all work over 12 hours per week.

It is anticipated that the enrollment at the College will increase as a result of the expansion of secondary and elementary school facilities now underway in Ethiopia. With the opening of the College of Agriculture, additional facilities at the Jima Agricultural Technical School may possibly be devoted to secondary-level education. The Ambo School has been staffed and equipped to prepare secondary students adequately for enrollment in the College.

Research

Soon after the college staff arrived in Ethiopia in 1952, plans were made for the initiation of certain phases of basic research in agriculture. During the short period of time that research has been in progress a sizable store of knowledge concerning Ethiopian agriculture has been accumulated. However, in comparison with that which is needed, only a meager beginning has been made.

Research conducted by the college staff has been carried on at a number of locations on the Central Plateau and in the Rift Valley. Research in soils, crops, and pastures has been conducted principally at Addis Abeba, Holeta, Shashemene, and Debre Zeyt. Research in livestock has been conducted primar-

ily at Addis Abeba and at Holeta. At the time of writing experimentation had not been initiated at the college site near Alem Maya.

Most of the work to date has been carried out at the Central Experiment Station at Debre Zeyt which has been in operation since the beginning of 1954. The Station is located at about the 1700-meter (5576-foot) elevation on the eastern part of the Central Plateau. About 70 hectares (172.9 acres) of land are included in the station farm. Most of this is cultivable. This particular site was chosen because it has soil types representative of those found throughout much of the Central Plateau. The climate and altitude of the Station represent somewhat of a compromise between the extremes found in Ethiopia. A wide variety of crops from all parts of the country may be grown there.

Two large sheds were constructed on the station property to provide storage space for seed, harvested grain, farm equipment, and research materials. The Station has been fenced to prevent grazing by numerous herds of livestock that frequent the area. Well-drilling equipment operated by crews trained under the United States technical assistance program has drilled a well which now supplies water for irrigating a portion of the land. A sprinkler irrigation system has been installed.

The Station, as planned, will eventually accommodate

research in soils, crops, pastures, and livestock; however, most research carried on to date has centered around crops, primarily small grains and horticultural crops. Plans have been drawn up for the construction of facilities which will permit the initiation of research in connection with livestock and grazing.

Further discussion concerning the research activities carried out by the college staff will be divided into the aforementioned areas; namely, soils, crops, pastures, and livestock. Few results of a conclusive nature have been obtained. However, a brief listing of some of the principal observations will be presented.

Soils. Two activities will be described. The first has to do with the establishment of a modern soils laboratory at the college administrative headquarters located in the Casa Popolari district of Addis Abeba. The laboratory is equipped to provide a quick-test analysis for texture, pH, phosphorus, potash, and percentage of organic matter. In addition to these analyses, a test of permeability can be made to partially determine suitability for irrigation.

By the end of 1954, a total of 1057 soil samples had been processed to determine the level of fertility. A summary of the results of these tests¹ is contained in the

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, op. cit., p. 18.

following statement:

The quick-test data gathered to date indicate that no soil has yet been found which could not benefit from application of straw or other material to keep it [the soil] in a dynamic state. Lime applications are needed throughout the entire lava plateau area [Central Plateau], as indicated by pH value. Phosphorus is the main limiting factor for increase of small grain yields throughout this same area. The organic matter content of these soils also reflects the poor management practice of re-turning little or no plant refuse and animal manure to the soil.

The second major accomplishment in the area of soils research is a system of land classification based upon the use that can best be made of the land as determined by slope, fertility, degree of erosion, surface features, and conservation practices considered necessary for sustained use. In working out the classification system, able assistance was received from the staff of the Jima Agricultural Technical School. The land classification system should be of immediate use in land resettlement and in outlining, at the community-level, programs for better land utilization. Eight classes of land are recognized and are listed below.^{1,2}

Class I land has up to 5 percent slope and is suitable for cultivation over a long period of time. This land is well-drained, deep, productive bottomland and is not subject to more than slight erosion regardless of management.

¹Ibid., pp. 39-43.

²Ibid., p. 18.

Class II land is also suitable for cultivation over a long period of time. However, it has up to 10 percent slope and is, therefore, subject to the limitations of slight erosion and moderate wetness.

Class III land exhibits from 5 to 30 percent slope, is moderately productive and can be safely cultivated if proper measures are taken to safeguard against erosion and other limitations. Under cultivation this land requires the intensive application of the best possible erosion control and soil management practices.

Class IV land may exhibit up to a 75 percent slope. It is therefore subject to severe erosion. This land is suited for limited cultivation if maximum use is made of conservation practices, but it is best suited for permanent vegetation.

Class V land is not suitable for cultivation due to a stony surface, shallow soil or other reason, but it is suitable for permanent vegetation. It may be used for grazing, or for woodland without special restriction. This land has not more than a 3 percent slope and is not subject to wind or water erosion.

Class VI land is suitable for the support of timber or permanent grass with moderate restrictions, particularly the prevention of overgrazing. It has a moderate slope and is subject to wind and water erosion. Deferred grazing is

recommended when this land is pastured.

Class VII land is suitable for pasture or woodland only with severe restrictions which include limited grazing and the establishment of a grass cover where it is needed.

Class VIII land has little or no economic value except for wild life. It is usually steep, stony, and relatively infertile.

Crops. Crop research has principally involved the introduction and testing of varieties. During the first two years most of the experimental work has been of an exploratory nature. One or more plantings of numerous varieties were made at various locations. This was done in order to accumulate, in a short time, as much information as possible regarding the date of planting and potentially superior varieties. Thereafter, effort was concentrated on the more promising varieties.

Early importations included 78 varieties of field beans, about 50 varieties of pasture and hay crops including both legumes and grasses, 18 varieties of hybrid corn, 10 varieties of cotton, seven varieties of sweet potatoes, and five varieties of castor beans. In addition there were importations of sorghum, popcorn, soybeans, and vegetables.¹ A

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Soils and Plant Science Department, op. cit., pp. 42-43, 52-53.

number of varieties of wheat, barley, and other small grains were imported at a later date. The aforementioned represent only initial purchases. Additional varieties and other crops were brought in during succeeding years. They came from six continents.

Most varieties were tested at no less than two locations which usually included Shashemene and Debre Zeyt. A large part of the introductions showed no particular promise. Some of them have been retained for further testing. Some of the more important observations made thus far will be presented.

In 1954 at Shashemene, a corn variety trial was undertaken to compare the best local selections with a number of imported varieties. The following observations were made:¹

1. A selection of Rift Valley corn outyielded 12 imported United States varieties. Only two of the latter produced yields within 25 percent of that of the local selection.
2. A Kenya yellow flint produced 27.2 quintals per hectare (43.2 bushels per acre) and was high producer in the variety trial. It yielded 11 percent above the best Ethiopian selection.
3. The Ethiopian selections averaged 20.6 quintals

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Second annual report. p. 14.

per hectare (32.8 bushels per acre) of shelled corn which exceeded random sampling of nearby farmer's fields by 45 percent.

In connection with the variety trial a simple experiment was set up to compare the Ethiopian broadcast method of planting with row planting. The observations were as follows:¹

1. Native corn planted in rows yielded approximately 45 percent above broadcast-planted corn.
2. Row-planted corn required three cultivations whereas broadcast-planted corn required six cultivations.

Preliminary work at Shashemene has indicated that combine milo maize imported from the United States may have a place in Ethiopian agriculture. However, the crop is subject to severe bird damage and to moderate disease damage.^{2,3}

During the 1955 growing season at the Central Experiment Station, 21 varieties of spring wheat were tested. Ten varieties were from Ethiopia; the remainder were from the United States, Canada, Kenya, and Italy. The variety, Kenya 5, produced the highest yield which was 37.8 quintals per

¹Ibid., p. 15.

²Ibid., p. 17.

³Imperial Ethiopian College of Agriculture and Mechanical Arts, Third annual report, p. 25.

hectare (56.1 bushels per acre). The variety Lee from the United States yielded 34.6 quintals per hectare (51.4 bushels per acre). The Ethiopian selections averaged 19.2 quintals per hectare (28.5 bushels per acre).¹ The same 21 varieties were planted at Shashemene where Kenya 5 and Lee were among the four highest-yielding varieties. On the basis of these and previous observations, plans were made for the stock of Kenya 5 to be increased at the Debre Zeyt Station.

A number of imported barley varieties were compared with Ethiopian selections at the Debre Zeyt Station in 1955. The highest-yielding variety was Monavian from the United States. The yield of this variety was about 16 percent above the best Ethiopian selection.²

Soybeans are not now grown in Ethiopia. However, because of religious fasting, during which time no meat is eaten, there is great need for a protein substitute such as soybeans. In 1955 seven soybean varieties were tested at Debre Zeyt. A United States variety called S-100 yielded 12.1 quintals per hectare (18.0 bushels per acre). The variety Lincoln,³ also from the United States, was poorest of

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Second annual report, p. 16.

²Imperial Ethiopian College of Agriculture and Mechanical Arts, Third annual report, pp. 12-14.

³Ibid., pp. 14-16.

imported varieties according to test results.

In 1955, experimental plantings of horticultural crops were begun at the Central Experiment Station. The testing of fruits and vegetables was made possible by the drilling of an irrigation well on the station property. Preliminary tests have indicated that with irrigation four crops of vegetables could be grown each year. Approximately 200 varieties of vegetables were tested for adaptability on the Central Plateau. A large percentage of the varieties of most crops produced well. Beans, root crops, and cole crops produced high yields of excellent quality. The yield of tomatoes, vine crops, and sweet corn was excellent and the quality was reasonably high. The produce from peas and greens was of relatively poor quality.¹

Seven hundred eight fruit trees representing 47 varieties were imported from a nursery in Nairobi, Kenya. These were planted on well-drained soil at the Station. A small percentage of the trees failed to grow due to a lack of moisture. They were planted before the irrigation system had been installed.²

Grassland and pasture. Research in this area has been limited to the study of grasses found in various parts of the

¹Ibid., p. 25.

²Ibid., pp. 39-44.

country and to the planting of certain species. During the latter half of 1953, collections of grasses were made by the college staff while inspecting possible sites for the location of the College. A total of 40 species were collected and identified. Other species were added to the collection later.¹

Certain forage crops have made a very satisfactory showing at Shashemene which has about 600 millimeters (23.6 inches) of rainfall per year. Trials have indicated that alfalfa can be grown in that area provided that precautions are taken with respect to seedbed preparation, fertilizing, and cutting. A variety from India has appeared best adapted. Kentucky 31 fescue, alta fescue, weeping lovegrass, and Italian ryegrass made a growth which was described as "excellent".²

One planting of 19 grasses was made at the Debre Zeyt Central Experiment Station in 1955.³ The greatest production of green material was made by sweet sudan grass followed by annual ryegrass, domestic ryegrass and white tef, or lovegrass. A relatively poor growth was made by crested wheatgrass, western wheatgrass, red top, reed canary grass,

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, First annual report, pp. 57-64.

²Imperial Ethiopian College of Agriculture and Mechanical Arts, Third annual report, p. 25.

³Ibid., pp. 21-24.

timothy, and Bermuda grass. This test was designed to compare production under grazing or in pasture mixtures.

Livestock. Research in this phase of agriculture has been directed toward the development of livestock that will meet specific needs. For example, an efficient milk-producing animal is needed to supply milk for Ethiopia's expanding urban population. For the production of export beef there is need for a more efficient meat-producing animal which will help to relieve some of the pressure on grazing land. In agricultural areas there is need for a dual-purpose animal which should reduce the total number of livestock and thus permit a large proportion of land to be used for the raising of crops.

The experience gained through various attempts to import cattle indicates that the importation of cattle as a direct approach to improvement is beset with serious problems, the principal one of which is disease. Because of this, attention has been given to the upgrading of native cattle. The school and college staffs have cooperated in an experiment which is intended to provide certain preliminary information in this regard. This project has been discussed in some detail in connection with the Jima Agricultural Technical School.

Plans have been made for the initiation of a dairy improvement program among herds in the vicinity of Addis Abeba.

This will be done through use of surplus bulls from the Shola Ber, a government-operated dairy farm.¹ The bulls which will be used are descendents of the cattle provided to Ethiopia by the United Nations Relief and Rehabilitation Administration.

In order to help determine which bulls might best be kept at the dairy and which ones should be used in the dairy improvement project, a system of record keeping was instituted at the dairy in March, 1955. An Ethiopian was trained for this responsibility. According to plan, bulls which are closely related to the best cows will be retained at the dairy. Less desirable but good bulls will be used to begin the upgrading of native cattle used for milk production in the vicinity of Addis Abeba.²

Extension

The agricultural education program in Ethiopia is organized to include extension training for persons who have had no opportunity to attend school or who have need for training beyond that received in school. The director of extension assigned to the Imperial Ethiopian College of Agriculture and Mechanical Arts arrived in Addis Abeba with the first detachment of college personnel. A second extensionist

¹Ibid.

²Ibid., p. 53.

arrived in September, 1952. A third began work in June, 1953.

During the first year a considerable amount of time was devoted to the study of conditions and circumstances surrounding the operation of extension in Ethiopia. This activity involved the gathering of as much information as possible concerning the people, the type of farming, the markets, the agencies with which extension activities could be associated, and the system of government particularly that at the local level.^{1,2}

Extension activities sponsored by the College have been carried on in three centers including Addis Abeba, Asmera, and Harer. At the latter place activities were instituted in connection with the Harer Teacher Training School and have been described in a previous section dealing with that school. The work underway at the other two locations will be reviewed.

Addis Abeba. One of the first services undertaken was that of propagating plants of sweet potato varieties which had been found to be well adapted to most of the Central Plateau.

¹D. B. Jeffrey. Agricultural extension in Ethiopia. Addis Abeba, Ethiopia. (Personal interview.) March, 1954.

²Marcus J. Gordon. Future for agricultural extension work in Ethiopia. Report presented at staff meeting of United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Oral.) June, 1954.

Slips were distributed to many parts of the country visited by extension personnel. Cuttings of one or more varieties were made available to missionaries, to displaced persons operating farms, to schools, and to numerous Ethiopian farmers. The imported sweet potatoes have produced well in most parts of Ethiopia except the very dry areas.

During 1954, the extension section of the College imported a number of small agricultural implements for testing in Ethiopia. The first machine tested was a treadle-operated threshing machine manufactured in Japan. The machine is designed for threshing rice but is adaptable to other small grains. It threshes but does not separate the grain. The machine weighs only about 90 kilograms (198 pounds); therefore it is readily transportable. When the straw is thoroughly dry, most small grains can be threshed. However, several modifications will be needed before the machine can be recommended for Ethiopia. A light-weight turning plow was imported from Austria. A one-row planter was purchased in Greece. Both of these machines were inexpensive and appeared to be adaptable to conditions in Ethiopia.

Extension personnel have taken an active part in the in-service education program for rural teachers. At their annual in-service training sessions teachers have been given instruction in the basic principles of agriculture. Most of the in-service education has been conducted at Jima.

Perhaps the most notable undertaking of the extension group was that of establishing extension agents in a number of communities. During 1954, two young Ethiopians were employed for this work. One was assigned at Asela in Arusi Province; the other was assigned at Fiche in Shewa Province. Both men were from farm communities and had attended rural schools prior to taking some secondary-level training at the Ambo Agricultural School. Both had been teachers for a period of time.¹ In 1955 an extension agent was assigned in Dese. During 1956, community programs were begun at Debre Birhan, Molale, Buta Jira, Yrga Alem, Woliso, Addis Abeba, and Harer. The two last-mentioned stations each have two agents. In addition to the 12 extension agents, there are two supervisors.

Despite the fact that extension principles were new to people and agents alike, progress has been made. The first major accomplishment has been the distribution of sheep among farmers. Through the cooperation of officials in the Ministry of Agriculture 1200 Merino sheep were made available for this purpose. However, certain stipulations have to be met before animals may be distributed to farmers. There first must be found, in a community, at least 15 interested farmers each of whom owns a minimum of 15 healthy native ewes. Each

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, Second annual report, p. 104.

farmer must dispose of his native rams and agree to keep other rams away from his flock.¹ Each farmer may then receive, free of cost, one Merino ewe and one or more rams depending upon the size of his flock. All cross-bred ewes are to be eliminated as early as possible. In return for the Merino breeding stock each farmer is required to give to the center the first Merino lambs until he has returned the number that he received in the beginning. All remaining sheep then become the farmer's property.² For an initial period of years the College has undertaken the responsibility of arranging for the shearing of sheep and marketing the wool. Farmers are required to bring their sheep to the center for shearing. At that time rams are exchanged among farmers.² The lambs received from farmers are then distributed to other farmers. Thus the program is self perpetuating.

The second type of activity undertaken has been that of assisting farmers with production problems. Extension agents have made numerous visits into rural areas to assist farmers with various problems such as livestock health, the control of pests, and the purchase of improved seed. Each center has been equipped with a seed treating machine so that farmers can bring their seed to the center and, for a nominal fee,

¹Ibid., pp. 74-75.

²Ibid.

treat it against smut.

A third type of activity has been the establishment of agricultural clubs. These have been organized in many centers where extension agents have been assigned. The club at Fiche is representative. Preparatory to establishing this club, the extension agent, with the permission of the headmaster of the local elementary school, talked with the assembled pupils. He explained to them how they could learn more about agriculture, could raise food for home use, and could possibly earn a small amount of money through the sale of products. He suggested that the pupils could participate in either poultry raising or in gardening.

Thirty-three boys enrolled for poultry raising and 38 enrolled in gardening.¹ The boys who were interested in poultry contributed small sums of money toward the purchase of material for use in the construction of a poultry shelter. The structure was erected within a few days by the extension agent and the pupils. Eggs of an improved breed were purchased and hatched under local setting hens. Club members sold eggs from the improved breed for as much as Ethiopian 20 cents (United States 8 cents) each. This was about five times the market value of eggs from native hens. The boys who were interested in gardening were given a small plot of ground near the school. All work was done by pupils. Seed

¹Ibid., pp. 104-105.

purchased in Ethiopia along with some imported from the United States was used. The agricultural club has been well received in the community and has been very successful.

Asmera. One extension leader was assigned to Eritra. He arrived at Asmera, the capital, in June, 1953. One of the first activities undertaken was the establishment of a series of result demonstrations designed to interest farmers in using an improved variety of wheat. Fifteen progressive farmers in various communities were asked to divide their tilled fields into two equal parts prior to planting. They were asked to use local seed in planting one half. In the other half of the field they were asked to plant Kenya 5, an improved variety, supplied by the extension worker. Farmers were informed that if the new variety did not produce as well as the local wheat, the difference would be made up to them in wheat. The overall yield of Kenya 5 wheat, as reported, was 29 percent above that of the local wheat. This figure could be considered modest because the yield data used in the computation was supplied by farmers.¹ The wheat demonstrations were staged on the property of key farmers. The results were viewed by a large number of people in the respective communities.

Other activities were conducted in Eritra. These in-

¹Imperial Ethiopian College of Agriculture and Mechanical Arts, First annual report, pp. 208-210.

cluded demonstrations in such practices as the spraying of cattle for control of parasites, the use of chemical fertilizers, irrigation practices, and the use of improved vegetable seed.

Scholarship Program

Institutions of higher learning are relatively new in Ethiopia. Prior to the advent of such educational facilities, all Ethiopians who received college-level training secured it outside of the country. Mention has previously been made concerning the personal interest which the Emperor has taken in sending students abroad for study. The fellowship program of the Food and Agriculture Organization has also been described in an earlier section. Other individuals and agencies both inside and outside of the country have made scholarships available to qualified Ethiopians. Most of the scholarships awarded have been provided by one of two agencies. These are the Ministry of Education and the United States technical assistance mission to Ethiopia.

Ministry of Education

The Ministry of Education has had a long-standing-scholarship program. Qualified students have been sent to many countries including Australia, Canada, Great Britain, India, and the United States. Since the American University

of Beirut was established, many students have been sent there.¹

In the past, students were awarded scholarships in any one of many fields considered important to the country's progress and development. However, with the expansion of educational facilities within the country there has been a shift in the policy of issuing grants for education. The Government now provides scholarships for only those who choose to study in a field for which there are no facilities within the country or for which facilities are inadequate.

There have been many problems encountered in sending students abroad. One of the most serious has been that of securing well-qualified trainees. The secondary school program has not been, in all instances, on a par with that in countries where students have undertaken educational pursuits. The language problem has been a major handicap to students studying outside of Ethiopia. Despite these deterrents a large percentage of Ethiopians successfully complete their study abroad.

United States technical assistance

In an agreement with the Ethiopian Government the United

¹N. A. Luonga. Ethiopian students now studying abroad. Office memorandum directed to the staff of United States technical assistance mission to Ethiopia. Addis Abeba, Ethiopia. (Mimeo.) August, 1954.

States technical assistance mission has made available certain funds for use in the training of young Ethiopians outside the country. In the case of these scholarships, the Ethiopian Government has paid for international travel, clothing, and incidental expenses. All other costs have been assumed by the technical assistance mission.

Foreign study is now rigidly restricted to those areas of study for which no facilities are available locally. Because of this, students may be sent abroad for study only in specialized areas of agriculture; for example, veterinary medicine, animal and crop breeding, and agricultural engineering. The expansion of the scholarship program has been limited by the availability of Ethiopians eligible for the training. Budgetary considerations have also been a limiting factor.

In September, 1951, seven Ethiopian students were granted awards for study at the American University of Beirut. One of the seven scholarships was for study in agriculture. These awards were made by the University. The first Point Four scholarships were granted in 1954. During that year 13 grants were issued. Only one was in agriculture; that was in crop breeding. Another was in educational measurements.¹ The number has risen progressively. Nearly 150 scholarships have been granted to date.

¹United States Operations Mission to Ethiopia. The Point Four program in Ethiopia. p. 35.

RECOMMENDATIONS FOR IMPROVEMENT AND EXPANSION OF
AGRICULTURAL EDUCATION IN ETHIOPIA

Certain basic principles may possibly serve as a guide in the formulation of recommendations for the improvement and expansion of agricultural education in Ethiopia. First, no idea, technique, or practice should be foisted upon the people, with the blind assumption that because it was successful elsewhere, it should be equally useful in Ethiopia. Instead, the utmost care should be taken to devise, step by step, a program that will satisfy specific needs of the country. The program should exhibit individuality as a result of its having been tailored to fit conditions peculiar to Ethiopia.

The statement has been made that no worker from the Western Civilization is qualified to advise peoples in the East and Near East on how to improve their way of life. On the other hand, quotations can be cited suggesting that people in underdeveloped areas need only to be shown Western methods; substantial improvement may be expected to follow. The former approach appears unreasonable while the latter appears to be an oversimplification of the problem. Undoubtedly, the most effective approach lies somewhere between these two extremes. On the basis of accomplishments in Ethiopia, it would appear that Western methods and techniques can be used successfully in that country if proper care and discre-

tion are exercised in doing so.

The second basic principle is that the program should not be allowed to become so involved financially or operationally that it will be burdensome to the country. Insofar as technical assistance is concerned, there is more to be gained from achieving a goal belatedly than from attempting an accelerated program at the risk of failure and the loss of good will.

Third, to be successful, the program of agricultural education should seek gradual rather than sudden and disruptive change. An attempt should be made to bring about a smooth transition from customs and practices now followed to new ones befitting local and world conditions.

Fourth, it would appear advisable to make the greatest possible use of local resources, both human and natural. Education and training should prepare Ethiopians to help themselves. A prime example is the employment of nationals in positions of responsibility. As rapidly as practicable, administrative, teaching, and research positions should be taken over by Ethiopians.

Fifth, although consideration in this study is given only to the development of agricultural education, there is a clear understanding that progress in this area must be accompanied by development and expansion in other areas including general education, transportation, government facilities,

taxation, and financing. It should be emphasized that institutional changes, in many instances, are prerequisite to technological innovation.

In accordance with the aforementioned guiding principles, certain recommendations may be made for the improvement of agricultural education in Ethiopia. Recommendations will be listed concerning schools of general education, community schools, technical assistance activities other than those involving schools and colleges, agricultural secondary schools, the College of Agriculture, research, and extension.

Schools of General Education

1. Because of the importance of agriculture in the Ethiopian economy, it is recommended that all elementary school teachers be given a certain minimum amount of instruction in agriculture. Such instruction should span a period of not less than two years and should be given late in the teacher education program. In schools where a teaching certificate is offered at the end of elementary school, instruction in agriculture should be given in grades seven and eight. In schools offering teacher education on the secondary level instruction in agriculture should be included in grades 11 and 12.

2. In elementary schools in rural communities some instruction in the fundamentals of agriculture should be

included in the curriculum. The instruction might include little more than gardening and the basic principles of poultry care. Even this meager offering should stimulate interest in the production of vegetables and fowl needed to provide a better diet. It would also lay the groundwork for future instruction. It could be discontinued when a community school became established in the same village.

3. In the interest of developing agriculture, there would appear to be merit in promoting the establishment of additional schools of the agricultural missionary type. Such schools could be of particular benefit to people living in the more remote areas.

Community Schools

1. It is recommended that the community school program be expanded. This will involve the following activities:

- a. At least one additional teacher education center should be established for the purpose of training community school teachers and leaders. The second center should be established at an altitude of less than 1680 meters (5510 feet). Teachers trained at this location could staff community schools in areas having a warm dry climate.
- b. After there has been accumulated about 5 years experience in establishing and operating community

schools, the rate at which new schools are opened should be increased, if possible, from a proposed 35 per year to 50 per year.

c. For the initial period which might extend from 30 to 40 years, priority should be given to increasing the number of schools rather than increasing the number of grades beyond four offered in schools already in operation.

2. It is recommended that as soon as facilities are available there should be undertaken an upgrading of standards for teachers and leaders in the community school program. Leaders, particularly, will be working with adults and should, therefore, be as well trained as possible. A secondary school education for these individuals would be desirable. This, however, will probably not be possible for some years.

3. Under the proposed program of operation, each community leader will be expected to provide out-of-classroom instruction for about 100 farmers. Presumably, a group of this size would occupy the leader's time for not less than 10 years. Because this number of farmers may represent only a small fraction of the farmers served by a school, it is recommended that more than one leader be employed at each school serving a larger-than-average community. With the addition of leaders the cost of facilities and equipment

would be increased only slightly, but the number of rural people receiving out-of-classroom instruction could be appreciably increased depending upon the number of leaders added.

4. Careful consideration should be given to the course of instruction offered by leaders in the community school. It should be designed to promote and encourage self help activities. In other words, through out-of-classroom instruction, rural people should be taught how to produce more and better food for home use, how to produce marketable crops and livestock, and how to improve living conditions in the community. The instruction should, therefore, encompass, in addition to the basic phases of agriculture, certain activities which are related to agriculture. For example, growing trees for fuel would permit crop residues and animal manure to be turned back into the soil. The curriculum could well include instruction in practices having to do with the production of wood on the farm. Another appropriate example is the construction of service roads leading from main roads to nearby communities now isolated because trucks and buses cannot negotiate the mountain trails.

5. Early attention should be given to the outlining of a cooperative program between agricultural schools and colleges and the community schools. Both the classroom and the out-of-classroom instructional programs as proposed by the

Long-Term Planning Committee of the Ethiopian-United States Cooperative Education Program are ideally suited to the spread of improved agricultural practices. The facilities of the community school are needed to relay information to the people.

Technical Assistance Activities Other
than Those Involving Schools and Colleges

1. In connection with the operation of service projects other than those involving schools and colleges, it is recommended that attention be given to more adequate training of nationals. In-service instruction if properly organized is ideally suited for use in Ethiopia. Only in rare instances is there justification for sacrificing training in order to increase production.

2. Officials of the various technical assistance agencies appear to have been cognizant of the need for keeping expenditure proposals within the realm which Ethiopia can be expected to support after technical assistance has been withdrawn. A continuation of this practice is recommended.

Agricultural Secondary Schools

1. One additional agricultural secondary school should be opened at the earliest possible date. Three more should

be established as soon as personnel and finances become available. Eventually, there should be one in each province and in Eritra. The first school should be opened at Asmera, the second at Debre Zeyt, the third at Gwondar, and the fourth at Kembolcha. A school is needed at Asmera in order to train students in the type of agriculture peculiar to that part of the country. Another school is needed at Debre Zeyt in order to fully utilize the facilities of the Central Experiment Station. It is recommended that secondary schools, other than the one at Jima, not offer instruction beyond the twelfth grade.

2. There should be a branch experiment station operated in conjunction with each of these schools. Whereas the Jima Station is now the center of coffee research, other stations, when begun, should be made the centers of other research. Since the export of beef is important to the economy of Eritra, research activity at the proposed Asmera Station might well center around beef cattle. That at Gwondar might be centered around cotton. The station at Kembolcha might specialize in development of forage crops or small grains or both.

3. If the development of community schools proceeds according to plan, a growing number of well-trained agricultural teachers will be needed with the passing of time. Because of this it is recommended that each secondary school set up

teacher-education courses and begin training agricultural teachers. Care should be exercised to enroll students from all parts of the country so that major languages would be evenly represented.

College of Agriculture

1. As of January, 1957, all members of the staff of the Imperial Ethiopian College of Agriculture and Mechanical Arts were from Oklahoma. In order to bring broader experience to bear upon problems in Ethiopia, it is recommended that henceforth at least half of the teaching, research, and extension staffs be recruited from outside of Oklahoma.

2. It is recommended that promising students who have graduated from the College be sent abroad for advanced study. Upon their return they should be encouraged to take up teaching and research responsibilities in the College or in a secondary school. In this way the time would be hastened when personnel from the United States would no longer be needed.

3. No specialization beyond a degree in general agriculture is presently offered at the College. There is an urgent need for veterinarians, agricultural economists, agronomists, animal husbandrymen, teachers of agriculture, and extension workers. Specialized instruction in these areas should be instituted as soon as financing and the

availability of staff permit.

4. To make possible the division of classes according to the aforementioned areas, it would be desirable for the college enrollment to be increased above the present enrollment of 89. A graduating class of from 35 to 50 students per year would appear desirable. On the basis of experience at Jima, in order to secure this number of graduates a total enrollment of 300 might be required initially. As teaching in elementary and secondary schools is upgraded, the total enrollment might be lowered to 250 students without decreasing the number of graduates. It is recommended that facilities at the College be expanded to accommodate 300 students temporarily and at least 250 students on a permanent basis.

Research

1. Research is vital to the advancement of agriculture in Ethiopia. In order that a large store of information may be amassed in the shortest possible time, it is recommended that certain research personnel be employed and be permitted to devote full time to major problems. As a minimum, there should be one individual to work with coffee, one with cereal crops, one with horticultural crops, one with plant diseases, one with beef cattle, and one with diseases of livestock.

2. A concerted effort should be made to review research

carried on at other centers of tropical agriculture. Particular attention should be given to the work done in Kenya, South Africa, and India.

3. Assuming that additional branch experiment stations are set up in connection with the proposed secondary schools in Ethiopia, careful attention should be given to coordinating the research at the various locations.

Extension

1. Until the community school system has been fully developed, a large part of the rural education effort may best be handled through extension. It is therefore important that the preparation of extension personnel at the secondary level be undertaken at once. It is recommended that such a program be instituted at Jima and at Agere Hiywet and at each of the proposed agricultural secondary schools.

2. In the meantime there will be need for a growing number of extension agents. They should be recruited from among the best-qualified applicants. It is recommended that the agents who have not had specialized training should attend the teacher in-service training program at Jima.

3. The question arises as to whether an extension agent and the community school leader should carry on activities in the same community. It would appear advisable to avoid, as

much as possible, offering both such types of training in the same community until the time when every sizable community has one or the other form of training.

4. However, it is recommended that extension supervisors recruited from among graduates of agricultural secondary schools assist community leaders in their work. A valuable service might be performed for the community school program if certain extension supervisors were to spend part of their time with leaders, helping the latter with difficult problems and relaying to them the latest developments in agriculture.

5. Until the qualifications for extension personnel can be standardized, in-service training for extension workers should be offered for at least 30 days per year.

Scholarships

1. There are strong disadvantages to sending students abroad for education. First, the instruction may not directly relate to Ethiopian agriculture. Second, there is the possibility that the student may not wish to take up employment in humble surroundings after his experience abroad. Third, the language barrier undoubtedly has an effect upon the usefulness of foreign study. For these reasons, it would appear advisable to send a minimum number of students outside the country.

2. One notable exception to the aforementioned suggestion is in the case of advanced degrees. A special effort should be made to encourage capable students to acquire advanced degrees which should be useful in research and teaching at higher levels.

SUMMARY

This study is a descriptive survey of agricultural education in Ethiopia including the educational activities carried on by the host Government, the United Nations, and the United States Government whose program of technical assistance in agriculture in Ethiopia has been carried on through the Oklahoma Agricultural and Mechanical Arts College.

Brief consideration was given to certain factors which are fundamentally associated with the development of agricultural education. These include the geography, the people, the Government, the Ethiopian Orthodox Church, and the transportation and communication facilities. The total impact of these factors has not been conducive to the development of agricultural education at a desirable rate.

A cursory description of native agriculture was presented in order to establish the relative stage of development and to identify some of the weaknesses, malpractices, and basic problems which should be given consideration in organizing teaching, research, and extension programs. In general, it was noted that the potentially productive agriculture is considerably underdeveloped and that there is a need for an effective program of agricultural education.

In Ethiopia, general education, like agricultural educa-

tion, is relatively new. Because it is hardly conceivable that the latter can develop fully without the former, limited consideration was given to general education. At the present time, only about one in 30 persons of school age is enrolled in school. The expansion of school facilities has been both slow and costly. However, such development is being supported by the host Government. Of particular importance to agricultural education is the community school program which as proposed will offer 4 years of fundamental instruction to rural people. In addition, provision has been made for the community school to offer out-of-classroom instruction for adults.

In July, 1946, the United Nations Relief and Rehabilitation Administration began a supply assistance program in Ethiopia. It continued for less than two years. The total program, as originally outlined, was limited to Ethiopian \$2.5 million (United States \$1 million). Approximately half of all supplies provided by the Administration were for agricultural development. Included were farm implements and machines, hand tools, livestock supplies and dairy equipment, and agricultural training materials. The services of a small number of technicians, 18 at the peak of the operation, were made available by the Administration to train Ethiopians in the use of supplies and equipment.

The United Nations Food and Agriculture Organization

began operations in Ethiopia in February, 1947, and is still functional there. The primary objective of the Food and Agriculture Organization has been to provide technical assistance. Projects were organized in such areas as animal disease control, hides and skins, coffee, cotton production, seed improvement, reforestation, and small agricultural tools. In addition, a limited number of fellowships have been provided for study abroad. Technical assistance offered by this agency has been directed toward the country's needs. However, the total accomplishment has been somewhat limited because of a restricted operating budget and a shortage of personnel.

The United States technical assistance program in Ethiopia was begun in 1952. The agricultural education offered therewith has been diversified. Part has been an in-service type of training in such areas of agriculture as pest control, animal disease control, agricultural machinery, cotton improvement, and coffee development. In connection with each project, emphasis has been placed upon the in-service training. At the same time, however, attention has been given to the development of each particular agricultural service.

From 1941 to the present, there has been a notable expansion of agricultural education in schools and colleges. A small part of this has been proposed for schools of general education, the community school being of particular impor-

tance. The community school program, as proposed for Ethiopia, includes classroom instruction for rural youth as well as out-of-classroom instruction for adults. It will provide a functional outlet at the community level for improved methods of agriculture.

Courses in agriculture have been incorporated into the curriculum of the Harer Teacher Training School. This has been done in order that primary and secondary teachers may be able to relay basic principles of agriculture to their pupils.

One major educational institution supported solely by the Ethiopian Government is engaged in agricultural education. This is the Ambo Agricultural School. Staffed by Germans, this school offers a secondary-level certificate in agriculture. The curriculum includes instruction in basic sciences. A specified number of hours of work are required of students. Such activity has been incorporated into the educational program in order to help students learn the application of theory.

The Jima Agricultural Technical School was opened in October, 1952 by personnel of the United States technical assistance mission. The school is ideally situated from the standpoint of the country's principal types of agriculture. The School was organized to offer 4 years of secondary-level instruction, but it was later expanded to include 2 years of college-level instruction. The average yearly attendance in

secondary school for the period from 1952 through 1957 was 128. As of the latter date, a total of 118 students had been awarded diplomas. The average yearly attendance in the 2-year college program for the same period was 33 with a total of 55 students having received certificates since the first college commencement which was in July, 1955. The curriculum at both levels has stressed the application of principles learned in the classroom. All students are required to devote a part of their time to the care of livestock, to the performance of farming operations, to the maintenance of the experiment station, and to the various other duties associated with the operation of the School.

At the Jima School, basic research has been initiated in connection with crops and livestock. Improvement in Ethiopia's coffee industry has received major emphasis. Attention has also been devoted to corn, sorghum, vegetable crops, cattle, and poultry.

One of the most important developments in agricultural education has been the establishment of the Imperial Ethiopian College of Agriculture and Mechanical Arts. Presently supported jointly by the governments of Ethiopia and the United States, this institution was opened for instruction on November 5, 1956.

To date, the only degree offered at the College has been in general agriculture although students are permitted limit-

ed choice among courses along with an opportunity to pursue particular interests with respect to library study. Eleven Ethiopians were awarded a bachelor of science degree at the end of the first academic year, 1956-1957.

Certain extension activities have been carried on by the college staff since 1952. The principal effort undertaken has been the distribution of improved varieties of crops and improved breeds of livestock, particularly sheep and poultry.

The college staff initiated exploratory research in 1952. Since then, experimental work has been increased in scope. Over 500 imported varieties of crops have been tested at various locations on the highland section of the country. Experimentation has largely centered around cereal crops, forage crops, and horticultural crops.

Recommendations were made for the improvement and expansion of agricultural education. They stressed the inclusion of more agriculture in the curriculum of schools of general education, the expansion of the community school program, the improvement of in-service type of training offered through technical assistance, the establishment of additional agricultural secondary schools, the expansion of the program at the College of Agriculture, and the expansion of research and extension programs.

On the basis of information presented, it would appear that, in general, definite progress has been made in the

establishment of agricultural education in Ethiopia and that an important contribution is being made to the development of agriculture in that country.

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APPENDIX A

PREFERRED SPELLING OF
GEOGRAPHICAL NAMES

A newly-established system of spelling geographical names has been used throughout the study. Devised by the Imperial Ethiopian Mapping and Geography Institute, the system is based upon the following:¹

1. Every consonant in Amharic has one vowel.
2. There are no double consonants.
3. The first form of any consonant is best represented by short e (not a or o), and the sixth form of any consonant by short i which is often not sounded. All other consonants are long as in Spanish or Italian.
4. In instances where two consonants are seen together, as in Debre Birhan or Eritra, the vowel between the two consonants is silent.

A great deal of investigation and study have gone into the development of this system which greatly facilitates correct pronunciation. The following list includes the preferred spelling along with other spellings commonly used of certain geographical names:

¹Gordon B. Schilz. Addis Abeba, Ethiopia. Information concerning spelling and pronunciation of Amharic geographical names. (Private communication). April, 1957.

Preferred spelling

Other spellings

Cities

Addis Abeba
 Agere Hiywet
 Alamata
 Alem Maya
 Aseb
 Asela
 Asmera
 Asosa
 Buta Jira
 Debre Birhan
 Debre Zeyt
 Dese
 Dire Dawa
 Fiche
 Gwonder
 Gwore
 Harer
 Jibuti (French Somaliland)
 Jijiga
 Jima
 Kembolcha
 Kworem
 Lekemt
 Mesewa
 Nazret
 Shashemene
 Teseney

Addis Ababa
 Ambo
 Alamatta, Alomota
 Hara Maya, Haramaya
 Assab, Asab
 Assela, Assella
 Asmara
 Assosa
 Butagira
 Debre Berhane
 Bishoftu
 Dessie
 Dira Dawa
 Fitchie, Fitchie
 Gondar
 Gore
 Harar
 Djibouti
 Jigajiga
 Jimma
 Cambolcha
 Quoram
 Lekempti
 Massawa, Massewa
 Adama
 Shashemanna
 Tesseney, Tessenei

Provinces

Arusi
 Begemdir
 Eritra
 Gemu Gwofa
 Gwojam
 Harer
 Ilubabor
 Kefa
 Sidamo
 Shewa
 Tigre
 Welega
 Welo

Arrussi, Arussi
 Bagemdir, Begameder
 Eritrea
 Gema Goffa, Gamu Gofa
 Gojjam
 Harar
 Ilubbabor, Illubabor
 Kaffa, Koffa, Cofa

 Shoa

 Wellega, Wallaga
 Walo, Wello, Wella

Preferred spelling

Other spellings

Rivers

Abay
Akobo
Awash
Barka
Fafen
Gash
Omo
Shebele
Tekeze

Abai, Abey
Akabo
Hawash
Bawka
Fafan
Ghash
Gibbie, Ghibbi
Webbe Shibeli
Tekezze, Takkaze

Other

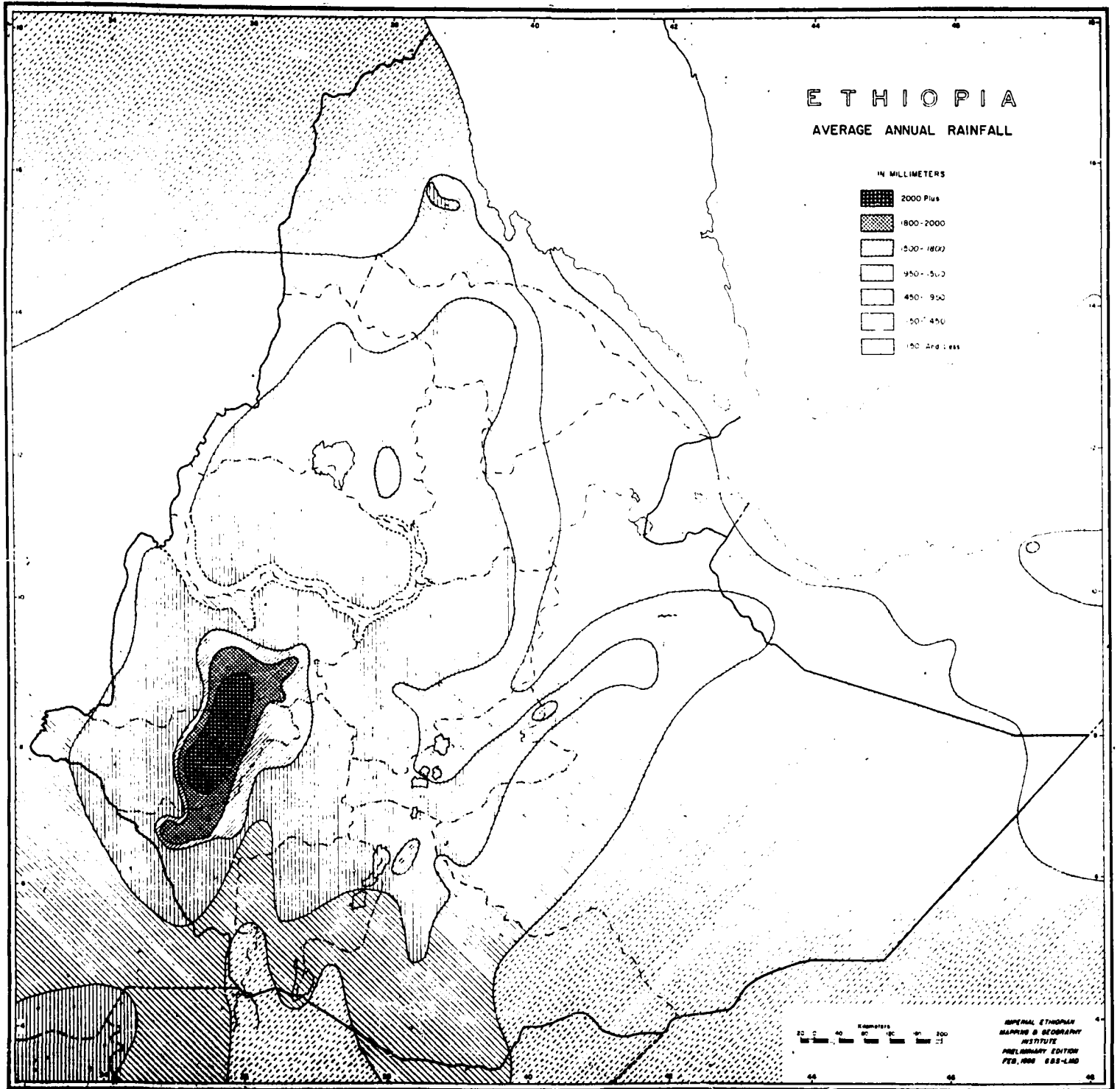
Kobo-Alamata Plain
Lake Tana
Lake Zuway

Cobo-Alamatta Plain
Lake Tsana
Lake Zwei, Zwey, Zwai

APPENDIX B

Figure 6. Average annual rainfall¹

¹Imperial Ethiopian Mapping and Geography Institute. Average annual rainfall. Preliminary edition. Map made and published by Institute. Addis Abeba, Ethiopia. February, 1956.



APPENDIX C

Figure 7. Vegetation regions¹

¹Imperial Ethiopian Mapping and Geography Institute. Vegetation regions. Preliminary edition. Map made and published by Institute. Addis Abeba, Ethiopia. December, 1954.

